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QUALITY ASSURANCE PROGRAMS PLANS FOR LANDFILLS 4, 5 AND 8 AND WASTE
BURIAL AREA EXCAVATION NAS FORT WORTH TX
5/1/2000
INTERNATIONAL TECHNOLOGIES



**NAVAL AIR STATION
FORT WORTH JRB
CARSWELL FIELD
TEXAS**

**ADMINISTRATIVE RECORD
COVER SHEET**

AR File Number 519



**UNITED STATES AIR FORCE
NAS FORT WORTH
(FORMER CARSWELL AFB)
FORT WORTH, TEXAS**

QUALITY PROGRAM PLANS

*Landfills LF-04, LF-05, and LF-8 Capping and
Waste Burial Area, WP-07 Excavation
NAS Fort Worth (Former Carswell AFB), Fort Worth, Texas*



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AFCEE Contract No. F41624-97-D-8024
Delivery Order 003
IT Project No. 774902
May 2000

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PART 1 SAMPLING AND ANALYSIS PLAN (SAP)

PART 2 QUALITY SYSTEM PLAN/CONSTRUCTION QUALITY PLAN (QSP/CQP)

PART 3 SITE HEALTH AND SAFETY PLAN (SHSP)

This document includes the quality program plan and includes the quality plans required for the capping of Landfills 04, 05, and 08 and "hot spot" removed at the landfills and WP-07 at NAS Fort Worth in Fort Worth, Texas. These documents were prepared by IT Corporation in accordance with Delivery Order Number 003 issued under the Remedial Action Contract Number F412624-97-D-8024 by the U.S. Air Force Center for Environmental Excellence.

This document includes a quality program plan which contains the following documents:

- Sampling and Analysis Plan (Part 1)
- Quality System Plan/Construction Quality Plan (Part 2)
- Site Health and Safety Plan (Part 3).

Final Quality Program Plan Part 1

Sampling and Analysis Plan

*Landfills LF-04, LF-05, and LF-08 Capping and Waste
Burial Area, WP-07 Excavation*

NAS Fort Worth (Former Carswell AFB), Fort Worth, Texas

AFCEE Contract No. F41624-97-D-8024

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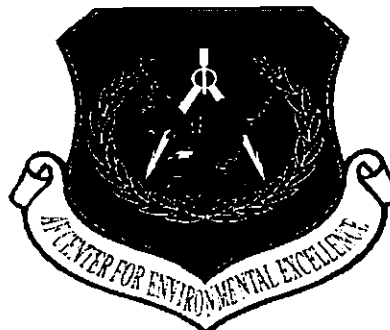
May 2000



IT CORPORATION

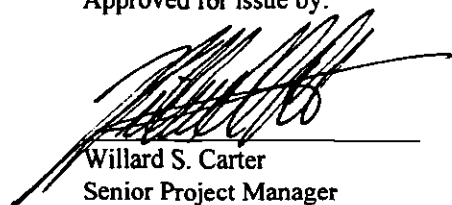
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Approved for issue by:



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Section 1 Objectives

The objectives of this sampling and analysis plan for Landfills LF-04, LF-05, and LF-08 Capping and Waste Burial Area, WP-07 excavation interim remedial action are to specify the sampling and analysis needed to verify that these areas can be closed under Texas Risk Reduction Standard II (Figure 1-1). It specifies the testing for these closures. The objective of the actions are to place a cap over each of the landfills in accordance with the Air Force design documents for these caps. The caps are to be protective of human health and the environment. The caps are also necessary to meet Texas Risk Reduction Standards for a Type II closure. There will also be excavation and disposal of buried contaminants to reduce or eliminate the source of contaminants in these areas.

LEGEND:

— FENCE

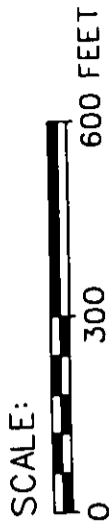
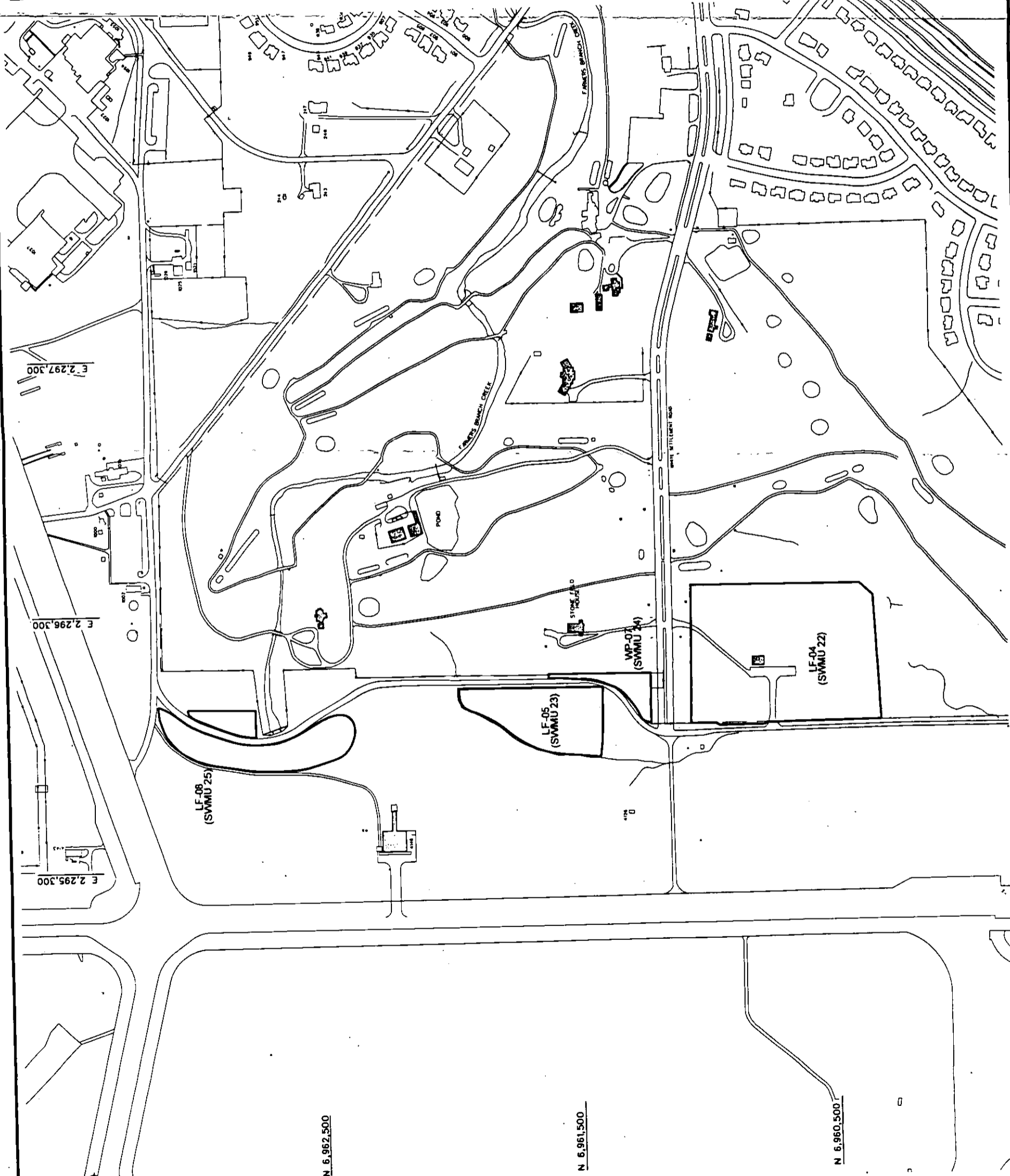


FIGURE 1-1
LANDFILL AND WASTE PIT
DISPOSAL AREA LOCATION MAP

NAS FORT WORTH JRB
FORT WORTH, TEXAS



02:36:02	STARTING DATE: 4/14/00	DATE LAST REV: 04/28/00	DRAFT CHCK. BY: D. HALL	INITIATOR: M. MAKI	DWG. NO.: 1768579es.192
04/28/00	DRAWN BY: M. CRAFT	DRAWN BY: M. CRAFT	ENGR. CHCK. BY: M. MAKI	PROJ. MGR: W. CARTER	PROJ. NO.: 768579

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Section 2 Project Scope

This section describes the selection of the data analytical methods and procedures and a summary of the sampling and analysis approach to be implemented in this project.

Definitive data analytical methods and procedures, preparation methods, and analytical procedures may be found in the Basewide quality assurance project plan, NAS Fort Worth Joint Reserve Base, Carswell Field, Texas, March 2000.

2.1 Sampling and Analysis Summary

The number of samples collected for analysis and analytical method required for this project will be summarized in Table 2-1 once the field investigation is complete and sample requirements defined. This table will be inserted into this plan. The number of field duplicate samples equipment blank samples, and matrix spike and spike duplicate samples has been shown in Table 2-1. Split samples may be collected upon request from Texas Natural Resources Conservation Commission.

2.1.1 *Compaction Testing*

Compaction of all landfill cover will be to the design specifications included in the Hydrogeologic, Inc. design under Air Force contract.

2.1.2 *Excavation Confirmation Sampling*

Soil samples will be collected from the floor and the walls of the "hot spot" excavations to evaluate effectiveness of the soil removal. Three samples will be collected from the excavator bucket from the open floor of an excavation. Sidewall samples will also be collected with the excavator bucket. The wall samples will be collected from 2 to 4 feet up from the bottom of the excavation from all four walls. Soil samples will be analyzed for the constituents in Table 2-1.

The specific locations will be specified in the final Air Force provided design documents.

Table 4-1

Soil Sampling
Project No. 774902
NAS Fort Worth, Texas

Parameters	Analytical Method	Matrix	Number of Sampling Events	Total Number of Samples Per Event	Field Duplicate (10%)	MS (5%)	MSD (5%)	Field Blank	Equip. Rinse	Trip Blank (1/cooler)	TAT Needed	Total Number of Billable Samples
Soil												
Totals												

The analyses required will be specified here based on the final Air Force design for "hot spot" removal.

Section 3 Project Organization and Responsibilities

All references to project organization and responsibilities with the exception of the project chemist may be found in Section 2 of the quality program plan for this project.

The Project Chemist is responsible for monitoring and controlling all aspects leading to the collection of environmental samples, tracking the analyses, and reviewing and including data in the project database to substantiate that closure objectives have been met.

Section 4.0 Field Operations

4.1 Equipment Decontamination

All equipment that may directly or indirectly contact samples will be decontaminated at the designated area. This includes buckets and sampling devices. In addition, the field crew will prevent the sample from coming into contact with potentially contaminating substances, such as tape, oil, engine exhaust, corroded surfaces.

The following procedure will be used to decontaminate soil sampling equipment (pans and knives) before each soil boring and between sample intervals:

- Steam clean to remove all loose dirt (spoons and barrels only).
- Wash in a non-phosphate, laboratory-grade detergent (Alconox or Liquinox).
- Rinse with tap water.
- Rinse with isopropyl alcohol.
- Rinse with hexane.
- Rinse with isopropyl alcohol.
- Rinse with deionized water.
- Air dry.
- Check equipment with FID and wrap in aluminum foil.

It is unnecessary to decontaminate the bucket of the excavator collecting soil for samples from bottom and side walls as long as the sample will be taken for "undisturbed" soil in the bucket that has not actually come in contact with other potentially contaminated soil.

4.2 Corrective Action

If conditions that are adverse to quality (e.g., nonconformances and variances) occur, the Project Manager and Quality Control Officer, will be contacted and they will consult Section 6.2 of the quality program plan for project corrective action.

4.3 Quality Assurance Report Procedures

The Project Manager, QC officer, and Project Chemist will converse on a regular basis to review possible and potential problem areas and to ensure that all quality assurance (QA)/QC procedures are being carried out. It is important that all data nonconformances, variances, and outliers be investigated to ensure that they are not a result of operator or instrument deviation but are a true reflection of the sample matrix, methodology, or task function. The project final report will contain a section that discusses data quality and usability. For additional information on the QA report consult Section 6.3 in the quality program plan for this project.

Section 5 Environmental Sampling

The construction material of the sampling devices discussed below will be appropriate for the contaminant of concern and will not interfere with the chemical analyses being performed.

All sampling equipment will be decontaminated according to the specifications in Section 4.1 prior to any sampling activities and will be protected from contamination until ready for use. Sampling equipment that is not ready for use (in storage) will be wrapped in aluminum foil to prevent cross-contamination from ambient sources.

5.1 Post “Hot Spot” Removal Sampling

Soil samples will be collected from the floor and each of the walls of a “hot spot” excavation from 2 to 4 feet from the bottom of the excavation to verify the effectiveness of the soil removal. Three samples will be collected from the excavator bucket from the open floor of the excavation. One side wall sample will be collected from soil collected in the excavator bucket from the wall of the excavation. The wall samples will be collected 2- to 4- feet above the floor of the excavation. Soil samples will be analyzed for specific contaminants of concern at the specific “hot spot” area.

The sampling analytical requirements are specified in the design documents for closures of the four areas.

5.2 Samples for Compaction

The sample requirements for compaction are defined in the cap design for each landfill.

5.3 Sample Handling

5.3.1 Sample Containers for Environment Samples

Sample containers for environment samples from “hot spot” excavation will be purchased pre-cleaned and treated according to U.S. Environmental Protection Agency specifications for the methods. Containers will be stored in clean areas in the sealed shipping boxes to prevent exposure to fuels, solvents, and other contaminants.

5.3.2 Sample Volumes, Container Types, and Preservation Requirements

Soil samples will be placed in one 250 milliliter clean, glass wide-mouth jar.

Sample holding times will be tracked from collection of samples until the analysis is complete. Holding times for methods required for the metals analysis are 180 days from collection.

5.3.3 Sample Identification

A sample is physical evidence collected from a facility or from the environment. An essential part of a sampling effort is the control of the evidence gathered. To accomplish this, a series of sample identification and chain of custody (COC) procedures have been established. One of the most important aspects of sample documentation is sample numbering. This numbering system will provide sufficient information concerning the sample to allow a uniqueness and stand-alone identity. A sample number would be used to trace the sample back to a date, time, and to identify pertinent sampling parameters on all pertinent documents. Sample location (including sampling point coordinates, depth, and site identification) is also an extremely critical parameter that will be documented according to the Environmental Restoration Program Information Management System (ERPIMS).

Sample identification system will employ the ERPIMS numbering system to assure that QC check samples originating from the field are linked to the correct batches and that the uniform and consistent numbering is used in the field. All applicable field data will be entered into the ERPIMS as described below:

A soil sample is defined in ERPIMS by the conjunction of a number of characters:

- Air Force Installation Identification
- Site Identification: a unique identifier used to represent a site within the installation.
- Location Identification (LOCID): a unique identifier assigned to a location within a site. The LOCID will be a combination of part of the site identification and sample identifier.

5.4 Chain of Custody

COC documentation is required for each sample to track collection, shipment, laboratory receipt, custody, and disposal. The COC is preprinted with a unique six-digit number in the upper right-hand corner. An example of a COC form is presented in Appendix A.

5.4.1 Sample Labeling

Correct labeling and documentation in a field logbook is necessary to prevent misidentification of samples. At a minimum, the following information will be recorded on the label:

- Project name and number
- Sample LOCID
- Date of sample collection -DAY/MONTH/YEAR (log date)
- Military time (log time)
- Sampling Technician
- Analysis requested.

5.4.2 Custody Seals

Custody seals are narrow strips of adhesive paper used to demonstrate that no tampering has occurred. They may be used on sampling equipment, sample transport containers, or individual sample jars. They should be signed and dated by the sampler. A minimum of two custody seals should be placed across the openings of the shipping containers

5.4.3 Field Notebooks

A field notebook is used to record all pertinent sampling information. The field notebook is a bound ledger, with consecutively numbered pages, that is maintained for a single project. Information pertaining to all aspects of the sample collection will be recorded in this document. At a minimum, the field notebook will contain the following information:

- Project or contract number
- Project location
- Purpose of sampling
- Specific sample location description (reference by station number or benchmark)
- Sample identification number
- Beginning and ending times for timed composite sampling (if applicable)
- Depths at which the sample was collected (if applicable)
- Sample volume
- Preservative (type and volume added)
- Physical characteristics of the sample
- Sampling methodology and charges/modifications
- Date and time of collection (military and time)
- Measurements, volume of flow/given time, pH of preserved samples, etc.
- Weather conditions (ambient field conditions)
- Additional samples, with reasons
- Levels of protection used (with justification)
- Sampling conditions
- Meetings and correspondence with clients, regulatory agencies, citizens, etc.
- Details concerning any samples split with another organization
- Details regarding any field QC samples

- Details of compositing or bulking procedures
- Field decontamination procedures used and modifications, if any.

All abbreviations of sample points and types of analysis are inserted in the front of the logbook. Writing in the logbook should be neat and in ink. If a mistake is made, one line should be drawn through it and initialed by the person correcting the mistake. Correction fluid should never be used in a logbook.

Notes will be dated and signed (each page) for validity in a court of law. When a consultant is used in the decision-making process, his/her remarks will also appear in these notes. Any consultant working on the project should submit a written report (draft) including his or her opinion and conclusions. A copy of this report should be placed in the project file and one copy placed in the sampling file for easy reference.

The person in charge of the sampling program will review these notes periodically and initial them at the bottom of each page. This person is also responsible for sending a copy of these notes to the appropriate supervisory personnel on a weekly basis. These notes will be reviewed for troubleshooting, quality control, and progress reports.

5.4.4 Field Custody Procedures

In collecting samples for evidence, collect only that number which provides a fair representation of the media being sampled. To the extent possible, the quantities and types of samples and sample locations are determined prior to the actual fieldwork. Minimization of sample transfers is always considered.

The field sampler is personally responsible for the care and custody of the samples collected until they are transferred or properly dispatched.

Sample labels will be completed for each sample using waterproof markers.

Throughout the course and at the end of the fieldwork, the project chemist/scientist determines whether these procedures have been followed and whether additional samples are required.

5.4.5 Transfer of Custody and Shipment

A COC record will accompany samples. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. The person receiving the samples should always inspect for correct sample description and sample count. This record documents transfer of custody of samples from the sampler to another person, a mobile laboratory, or an analytical laboratory. The original record will accompany the shipment, and a copy will be retained in the project files.

Samples will be properly packaged in accordance with U.S. Department of Transportation regulations for shipment and dispatched to the selected laboratory for analysis with a separate custody record prepared for each laboratory. COC records will be placed in a gallon Ziploc™ bag and taped inside the cooler lid.

Airbills from the courier will be retained as part of the permanent documentation. The person relinquishing the sample signs off his custody and enters the courier company's name and the bill-of-lading number or airbill number.

When samples are split with the facility or another government agency, a separate custody record is labeled to indicate this. In addition, the sample numbers from all the labels are recorded on the custody record. The person relinquishing the samples to the facility or agency should request the signature of a representative of the appropriate party, acknowledging receipt of the samples. If a representative is unavailable or refuses to sign, this is noted in the "received by" space. When appropriate (i.e., the representative is unavailable), the COC should contain a statement that the samples were delivered to the designation location at the designated time. The copy of the COC record may be given to the facility or agency upon request.

5.4.6 Laboratory Custody Procedures

Once the sample arrives at the laboratory, custodial responsibility of the sample is transferred to that facility. The minimum requirements for a laboratory custodial system are:

- Designation of a sample custodian whose duties include:
 - Receiving samples
 - Inspecting and documenting sample conditions; e.g., temperature, pH, leakage, breakage, seal
 - Verifying and recording agreement of information on the sample documents
 - Marking/labeling of samples for laboratory use
 - Initiating paperwork within the laboratory
 - Distributing samples to appropriate analysts
 - Placing samples and extracts into the appropriate storage and/or secure areas
 - Controlling access to samples and extracts

- Monitoring storage conditions for proper temperature and prevention of cross-contamination
- Proper disposal of samples and extracts
- Secure appropriate storage for samples and extracts
- Sample tracking system
- Controlled access to storage areas
- Monitoring procedures for storage areas.

5.4.7 Sample Handling and Shipping Policy

This policy is designed to limit corporate and individual liabilities through strict compliance with DOT, Federal Aviation Administration, and International Air Transport Association regulations. Failure to comply with these regulations may result in the confiscation of shipments, civil penalties, and potential criminal violations. Therefore, all IT Corporation (IT) personnel are expected to follow these guidelines. These guidelines are based on three fundamental types of sample materials:

- Environmental samples (air, water and soil)
- Known dangerous goods (cyanide plating solutions, flammable materials, oxidizers, etc.)
- All other unknown sample materials (drums, tanks, lagoons, etc.)

Environmental samples are materials that are collected from off-site areas and/or are not expected to be grossly contaminated with high levels of hazardous materials. This determination is made according to the judgment and knowledge of the sampler. If there is insufficient information on which to base this determination, treat the sample as a packaging category III (unknown). Known dangerous goods/hazardous materials are materials, which have known dangerous characteristics, are reasonably identified as a hazardous materials (see DOT HM-181 for the definition of hazardous materials). These will be packaged, marked, labeled, and shipped in accordance with the guidelines established in the alphabetical list of hazardous materials (DOT HM-181). Contact the Project Transportation and Disposal Coordinator regarding shipment of these materials.

Unknowns and all other materials not identified above are unknown samples being shipped to a laboratory for testing to determine hazard class or samples of hazardous wastes. These samples will be shipped according to guidelines set out in the "Standard" UN/ICAO General Packing Requirements or DOT HM-181.

In order to simplify and standardize the process, samples from packaging categories I and III will be shipped via air express as hazardous materials or "Dangerous Goods." This is a more

conservative effort and will be followed completely. Follow IT standard procedure for shipping samples to a laboratory.

5.5 Field Quality Control Samples

Field quality control samples include:

- Equipment blank
- Field duplicate.

Field duplicate samples will be collected on a 1:10 frequency rate and submitted for the same analytical parameters required for the original samples.

Equipment blanks will be collected on a 1:20 frequency rate. Trip blanks shall accompany all equipment blank samples shipped to the laboratory.

Section 6 Record Keeping

IT will maintain field records sufficient to recreate all sampling and measurement activities and to meet all ERPIMS data loading requirements. The requirements listed in this section apply to all measuring and sampling activities. Requirements specific to individual activities are listed in the section that addresses each activity. The information will be recorded with indelible ink in a permanently bound notebook with sequentially numbered pages. These records will be archived in an easily accessible form and made available to the Air Force upon request.

The archiving (or filing) system proposed for this project is as follows:

- Communications
 1. Internal
 2. External
- QA/QC
 1. Procedures
 2. COC
 3. Audit Reports
 4. Laboratory QC reports
 5. Deviation notification forms
 6. Nonconformance/corrective action reports
 7. Sample tracking system
 8. Daily QC reports
- Technical Information
 1. Analytical data
 2. Field data
 3. Field logbooks
 4. Data quality evaluation forms
 5. Calculations/evaluations
 6. Regulatory compliance
- Health and Safety
 1. Plans/procedures
 2. Safety inspection and air monitoring reports
 3. Audit reports
- Documents
 1. Plans
 2. Reports
 3. Relevant publications

Additional subcategories may be added at the Project Manager's discretion. All files will be kept for a minimum of 5 years after termination of the work order.

The following information will be recorded for all field activities:

- 1) Location
- 2) Date and time
- 3) Identity of people performing activity
- 4) Weather conditions.

For field measurements:

- 1) Numerical value and units of each measurement
- 2) Identity of and calibration results for each field instrument will also be recorded.

The following additional information will be recorded for all sampling activities:

- 1) Sample type and sampling method
- 2) Identity of each sample and depth(s) (where applicable) from which it was collected
- 3) Amount of each sample
- 4) Sample description (e.g., color, odor, clarity)
- 5) Identification of sampling devices
- 6) Identification of conditions that might affect the representativeness of a sample (e.g., refueling operations, damaged casing).

For ease in ERPIMS data management, the appropriate field forms, data management instructions, and valid value lists are provided in Appendix A.

Appendix A

Field Forms, Data Management Instructions, and Valid Value Lists Form



519 23

Project:

Sampling Method:

Sample Team: _____

[illegible]

Comments: _____

Sketch Location:

Logged BY / Date: _____

Reviewed BY /Date:

INTERNATIONAL
TECHNOLOGY
CORPORATION

FIELD WORK VARIANCE FORM

PROJECT NO. _____ VARIANCE NO. _____
PAGE _____ OF _____
PROJECT NAME _____ DATE _____

VARIANCE (INCLUDE JUSTIFICATION):

APPLICABLE DOCUMENT:

CC:

REQUESTED BY:

DATE

APPROVED BY:

DATE

Project Manager

Quality Assurance Officer

DATE



**INTERNATIONAL
TECHNOLOGY
CORPORATION**

Nonconformance No:

Linked w/Variance No (if applicable):

Date of Issue:

Page 1 of 1

Project Name:

Project Number:

- Nonconformance Report -

I. Summary of the Change:

Identified by:

Date:

II. Nonconformance Requested:

To Be Performed by:

Date:

To Be Verified by:

Date:

III. Justification for Nonconformance:

IV. Applicable Document/Work Plan:

Distribution List:

- Signatures -

Requested by:

Date

Approved by:

Date

Proj Manager Approval:

Date

QA Approval:

Date



Reference Document 322561
Page 1 of 519 26

Required Report Date ¹¹[illegible]

Comments: 29



Reference Document No. 30
Page ___ of ___

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Project Name:

Project No.

Samples Shipment Date

ONE CONTAINER PER LINE

[illegible]

White: To accompany samples

Yellow: Field copy

*See back of form for special instructions.

1. **Project Name/Number:** Record the name of the project or client/site location, and the billing number of the project (Example - 613215; XYZ Chemical Co. WA).
Sample Team Members: List the names of all the members of the team taking these samples; team leader's name first.
Profit Center Number: For intra company work, indicate the originating profit center number.
4. **Project Manager:** Record the project manager's name.
5. **Bill to:** Non-IT personnel should indicate the correct billing address and the person to whom the invoice should be sent. IT personnel and IT subcontractors should fill in IT office responsible for project accounting (if known).
6. **Purchase Order No.:** Non-IT personnel should use this space to record the purchase order number authorizing the analysis of these samples. IT personnel and IT subcontractors should leave this space blank if a project number has been given for billing.
7. **Samples Shipment Date:** Indicate the date these samples are shipped to the laboratory.
8. **Lab Destination:** Indicate the laboratory designated for sample shipment. Do not list more than one lab on this form. Be certain before sending samples that the laboratory you are designating is aware of the shipment and is capable of accepting these sample types and has available capacity.
9. **Lab Contact:** Give the name of the laboratory contact (typically the Lab Project Manager).
10. **Send Lab Report to:** Give the name, address and phone number of the person to receive the data report for these samples.
11. **Required Report Date :** Record the date which you and the laboratory contact have determined the results will be reported (include verbal or final report as appropriate).
12. **Project Contact/Phone:** Indicate the name of the project person to be contacted in case of any questions regarding these samples and the phone number where the contact may be reached the day the samples arrive in the laboratory.
13. **Carrier/Waybill Number:** If you are sending the samples by a commercial carrier such as Airborne or Federal Express, record the courier company name and the waybill or airbill number under which these samples will be shipped (Example - Fed-Ex/ #513631771).
14. **Sample Number:** List the complete, unique, identification number of each sample. These numbers must correspond with the identification numbers on the sample containers and the field sample collection document(s).
15. **Sample Description/Type:** Provide a short physical description of the sample and the sample type such as soil, sediment, sludge, water, wipe, air, concentrated waste or bulk.
16. **Date/Time Collected:** Record date and exact time each sample was collected. Use a 24-hour clock; i.e., 1645 not 4:45 p.m.
17. **Container Type:** Indicate the volume, color and type of the sample container used (Example - 1 gallon amber glass, 1 liter clear plastic, 40 milliliter clear glass).
18. **Sample Volume:** Estimate the amount of sample in the container. For air samples, indicate the volume of air sampled.
19. **Preservation:** Indicate what type of preservative, if any, has been used for the samples (Examples - ice to 4°C nitric acid, hydrochloric acid).
Requested Testing Program: List the analyses to be performed on each sample by method number.
- Condition on Receipt: Before a custody transfer, the intended recipient should verify all samples are present and in good condition. This column may be used by the recipient to record any abnormalities found at the time of the transfer (Examples - jar lid cracked, sample bottle leaking).
22. **Disposal Record No.:** Used by the laboratory to record requisite disposal information. Not used when samples are returned to client.
23. **Special Instructions:** Use this space to record any special instructions to the lab regarding the processing of these samples.
24. **Possible Hazard Identification:** Indicate all hazard classes associated with the sample(s).
25. **Sample Disposal:** Indicate how the samples should be disposed of following analysis. All samples are held six weeks and then disposed of unless other arrangements for storage have been previously requested. Lab will charge for packing, additional archiving and disposal.
26. **Turnaround Time Required:** Check "Normal" or "Rush" as determined by the Project Manager and the laboratory contact. Rush samples are subject to a surcharge.
27. **QC Level:** These are ITAS QC levels and should not be confused with USEPA Analytical Levels.
 - Level I:** ITAS standard practice. Use available analytical procedures. Fifteen percent quality control (QC) samples (blank/spike/duplicate) for every 20 samples. QC samples may not be performed for a specific project but as part of compiled sets of samples. QC data not reported with analytical results. ITAS published rates apply to client samples tested.
 - Level II:** Use available analytical methods. Fifteen percent QC samples minimum (blank/duplicate/spike or duplicate spike) QC samples are project or client-specific. QC summary report include with analytical results. No raw data are included. Each QC sample billed as real analytical sample.
 - Level III:** Uses referenced regulatory procedures, and/or established/verified procedures using confirmatory techniques. Method blank plus 20 percent or tow QC summary minimum per each matrix. QC summary report supplied with supporting data. Where applicable, this is USEPA Contract Laboratory Program (CLP) package. Surcharge is added and/or QC samples are billed at sample rates. Costs based on analytical program required.
- Project-specific:** Defined in QAPJP, Work Plan, or other specific plan or procedure. Project documentation must be submitted to the laboratory before beginning work. Project requirements for QC samples cannot be less than Level I.
28. **Signatures:** When releasing custody of these samples, use the "Relinquished By" space to sign your full legal name, company name, date and time of release. After verifying that all samples are present, the person receiving the samples must sign the "Received By" space to take custody of the samples.
29. **Comments:** Provide any additional explanatory information that may be required (Example - samples stored overnight in temperature controlled, secure refrigerator).

Final Quality Program Plan Part 2

Quality System Plan/Construction

Quality Plan

Landfills LF-04, LF-05, and LF-08 Capping and Waste

Burial Area, WP-07 Excavation

NAS Fort Worth (Former Carswell AFB), Fort Worth, Texas

AFCEE Contract No. F41624-97-D-8024

Delivery Order 003

IT Project No. 774902

May 2000



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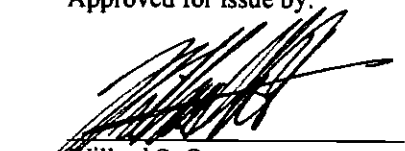

Willard S. Carter
Senior Project Manager

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Acronyms and Abbreviations

AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AFBCA	Air Force Base Conversion Agency
CDRL	contract data requirement list
CIH	Certified Industrial Hygienist
CMS	corrective measures study
CQC	construction quality control
CQP	construction quality plan
DBCRA	Defense Base Closure and Realignment Act
DO	delivery order
DQO	data quality objective
ECP	environmental cleanup plan
EPA	U.S. Environmental Protection Agency
FSP	field sampling plan
FWV	field work variance
IRP	Installation Restoration Program
IT	IT Corporation
NAS	Naval Air Station
NEPA	National Environmental Policy Act
PCB	polychlorinated biphenyl
QA	quality assurance
QC	quality control
QPP	quality program plan
QSP	quality system plan
Radian	Radian Corporation
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SAP	sampling and analysis plan
SOP	standard operating procedure
SOW	statement of work
SSHP	site safety and health plan
SWMU	solid waste management unit
UST	underground storage tank

Section 1 Introduction

This quality system plan (QSP)/construction quality plan (CQP) provides specific quality control (QC) information to perform a remedial designs/remedial action at Naval Air Station (NAS), Carswell Air Force Base (AFB), Texas. IT Corporation (IT) prepared this document and will perform the work in accordance with delivery order (DO) number 003 issued by the U.S. Air Force Center for Environmental Excellence (AFCEE) under the Remedial Action Contract Number F412624-97-D-8024. The project tasks are outlined in the statement of work (SOW) dated February 25, 1998 (AFCEE, 1998) and the IT DO proposal dated February 1998 (IT, 1998).

1.1 Site Description

Carswell AFB was first activated in 1918 as a combat pilot training school. The Base officially closed on September 30, 1993. The Carswell AFB Disposal and Reuse Final Environmental Impact Statement was filed with the U.S. Environmental Protection Agency (EPA) on April 29, 1992. A National Environmental Policy Act (NEPA) record of decision was issued on March 31, 1993. The Air Force Base Conversion Agency (AFBCA) is identifying the priority of disposal and reuse of each parcel, based on market demand and the reuse goals of the local community.

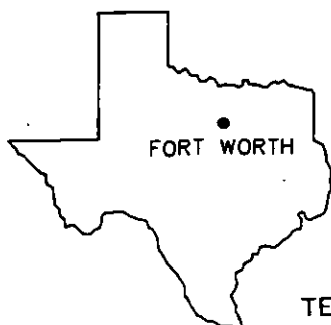
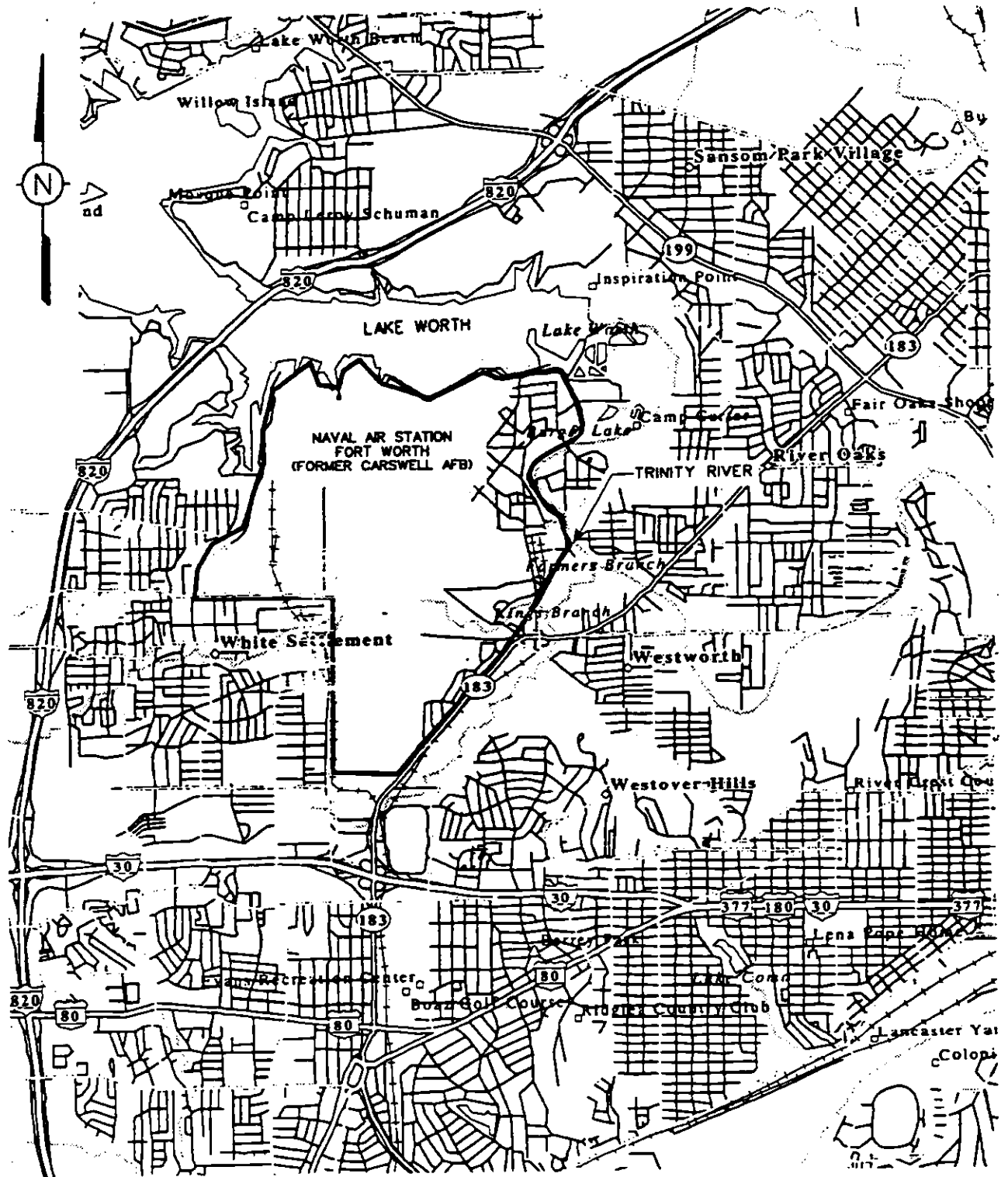
Due to a realignment, Carswell AFB has been renamed the NAS Fort Worth. It is located in north central Texas in Tarrant County, 8 miles west of downtown Fort Worth (Figures 1-1 and 1-2). The base property, totaling 2,555 acres, consists of the main base and two noncontiguous parcels. The main base comprises 2,264 acres and is bordered by Lake Worth to the north, the west fork of the Trinity River and Westworth Village to the east, Fort Worth to the northeast and southeast, White Settlement to the west and southwest, and Air Force Plant 4 to the west. The area surrounding NAS Fort Worth is mostly suburban, including the residential areas of the cities of Fort Worth, Westworth Village, and White Settlement. The land uses west of the base are predominantly industrial. These include supporting commercial centers, Air Force Plant 4, and an industrial complex in White Settlement.

1.2 Previous Investigations

In 1984, the Air Force Installation Restoration Program (IRP) was initiated at the former Carswell AFB and began with a program records search by the Air Force. Since 1984, IRP studies have been conducted by several contractors, have focused on the identification and characterization of waste disposal areas and solid waste management units (SWMU) identified in the installation's hazardous waste storage permit (HW 50289) issued in 1991. A total of 68 SWMUs were identified and investigated by A.T. Kearney, Inc., in a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) conducted in 1998.

Pursuant to the Defense Base Closure and Realignment Act (DBCRA) of 1990, the former Carswell AFB was selected for closure and associated property disposal during Round II Base

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04/27/00	DRAWN BY: K.BLAIR	DRAWN BY:	ENGR. CHCK. BY: W.CARTER	PROJ. MGR.: W.CARTER	PROJ. NO.: 765725



TEXAS

FIGURE 1-1
NAS FT. WORTH LOCATION
SITE MAP

NAS FORT WORTH JRB
FORT WORTH, TEXAS



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Closure Commission deliberations. However, it has recently been realigned, and most of the property will eventually be transferred to the U.S. Department of the Navy. Hence, Carswell AFB has been designated as the NAS Fort Worth.

Landfill LF-04 operated from 1956 to 1975 and reportedly received paint, thinners, strippers, cadmium batteries, waste solvents, and miscellaneous burned wastes. The site underwent a RCRA Facility Investigation (RFI) in 1997 and is currently undergoing a corrective measures study (CMS). The draft RFI report (IT, 1997) indicated that while in use, at least six large pits approximately 12 feet deep were filled with refuse, which was reportedly burned and buried. Medical wastes (hypodermic needles, syringes, IV tubing) were encountered in subsurface soils during the test excavations for the RFI. The buildings located on LF-04 were used as radar installations and will be removed. The site is located on the western boundary of the base golf course (Figure 1-3).

Landfill LF-05 operated from 1963 to 1975 and reportedly received all types of flightline wastes and refuse. The site underwent an RFI in 1997 and is currently undergoing a CMS. The site is located adjacent to the western boundary of the base golf course (Figure 1-4).

Waste Burial Area WP-07 received buried drums containing cleaning solvents and leaded sludge from the flightline in the 1960s and underwent a remedial soil removal action in 1991. The site underwent an RFI in 1997 and is currently undergoing a CMS. The site is located adjacent to the western boundary of the base golf course (Figure 1-5).

Landfill LF-08 operated from 1960 to 1969 and reportedly received nonhazardous fill material including landscape debris, construction debris, and metal. The site underwent an RFI in 1997 and is currently undergoing a CMS. The site is located adjacent to the western boundary of the golf course (Figure 1-6).

1.2.1 Regional Geology

Quaternary alluvium is found at the surface through most of the NAS Fort Worth area. The alluvium consists of floodplain and fluvial terrace deposits of gravel, sand, silts, and clay that occur as a veneer on the eroded surface of the Upper Cretaceous strata.

Previous drilling activities at NAS Fort Worth indicate that the alluvial deposits vary in thickness from less than 10 feet to approximately 50 feet in thickness and generally thicken in an east to southeastern direction toward the Trinity River. In general, silt and clay with varying amounts of sand and gravel occur at land surface down to depths of 5 to 10 feet. Underlying the silt and clay is a sand and gravel unit that normally increases in grain size with increasing depth. The sand deposits are fine to coarse-grained, tan to rust in color, and composed predominantly of quartz grains. Gravel is mostly limestone and fossilized shell fragments ranging in size from fine to cobbles. The gravels were deposited as channel lag deposits on the scoured surface of the underlying Cretaceous strata.

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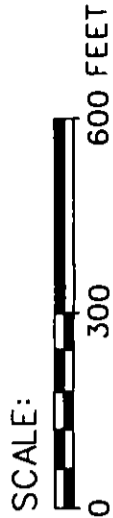
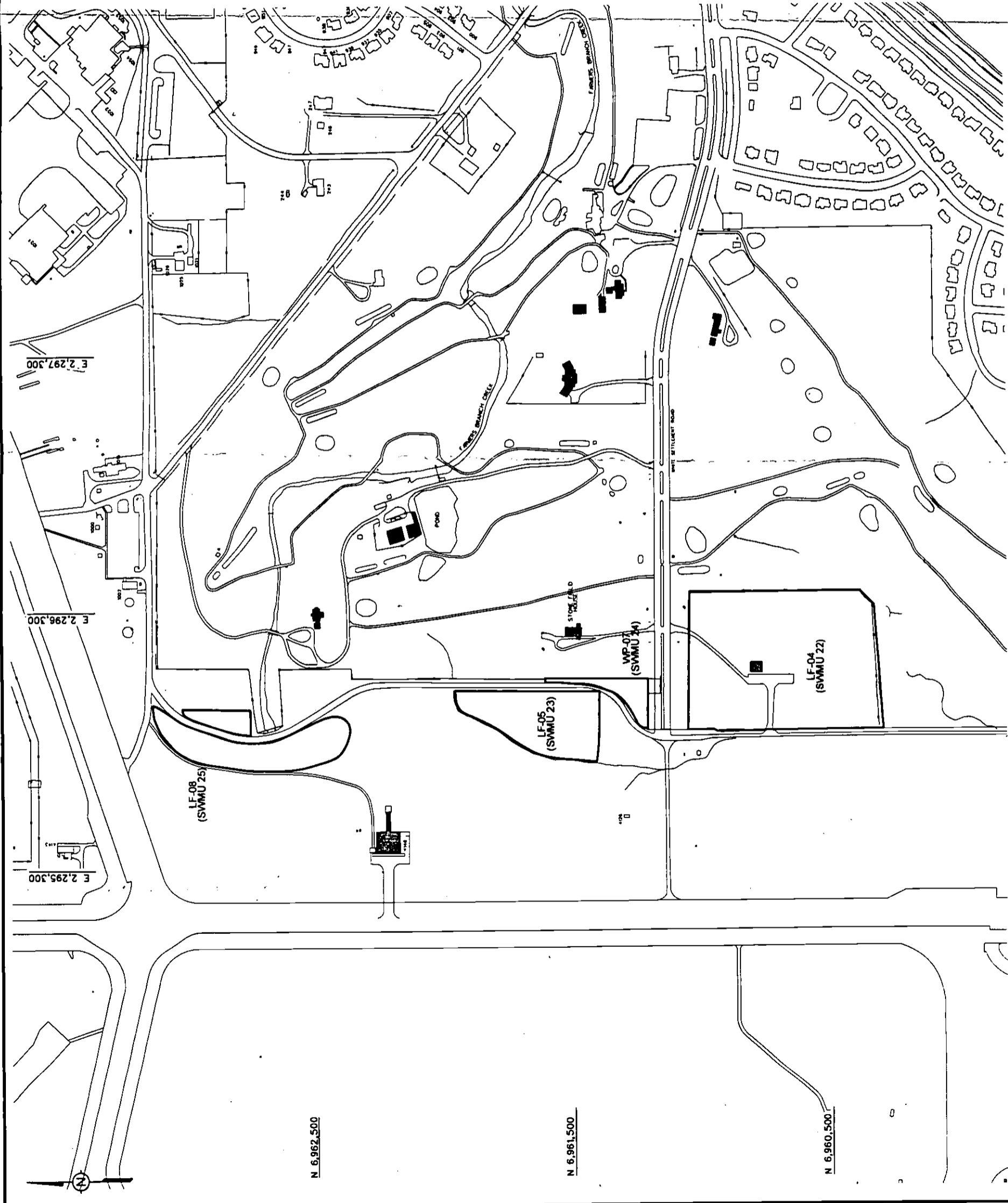


FIGURE 1-2
LANDFILL AND WASTE PIT
DISPOSAL AREA LOCATION MAP

NAS FORT WORTH JRB
FORT WORTH, TEXAS



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04/28/00	DRAWN BY: M. CRAFT	DRAWN BY: M. CRAFT	ENCR. CHCK, BY: M. MAKI	PROJ. MGR: W. CARTER	PROJ. NO.: 768579

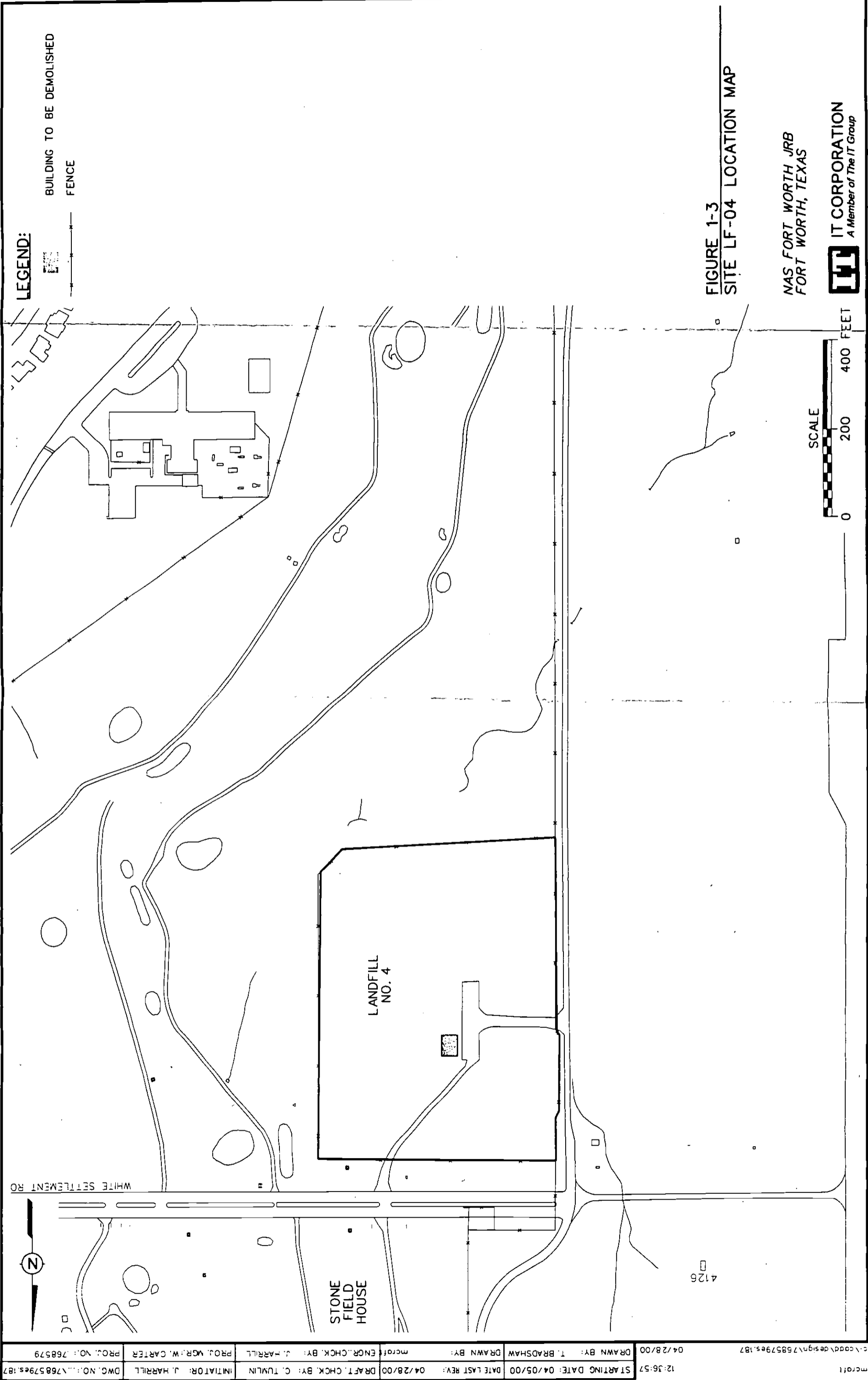


FIGURE 1-3
SITE LF-04 LOCATION MAP

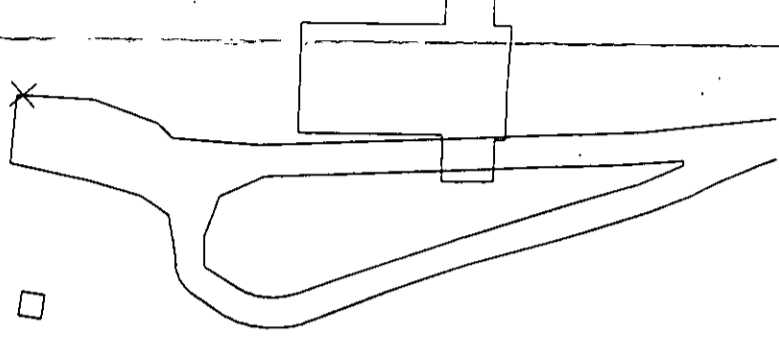
NAS FORT WORTH JRB
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LF-05



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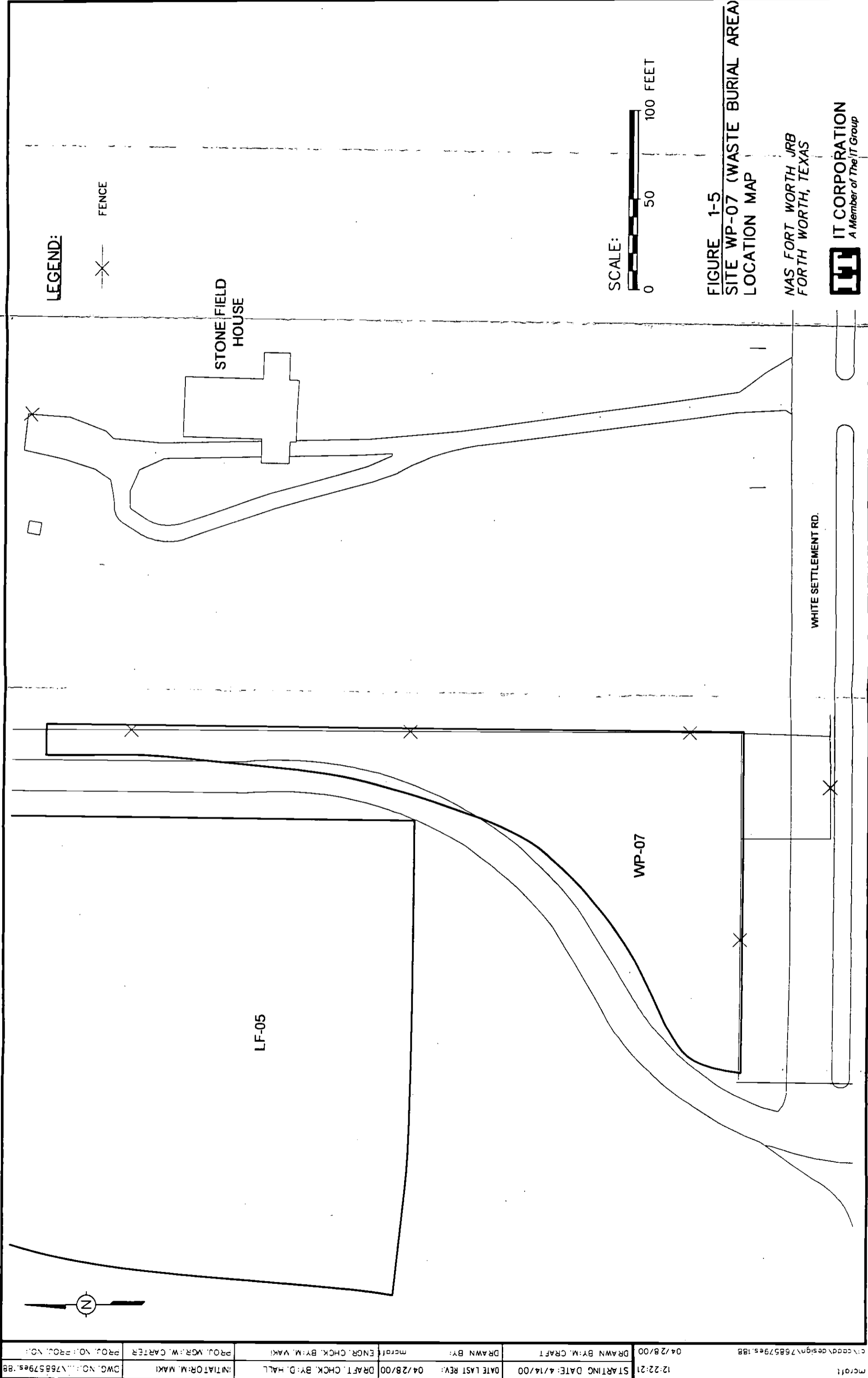


FIGURE 1-4
SITE LF-05 LOCATION MAP

NAS FORT WORTH JRB
FORT WORTH, TEXAS

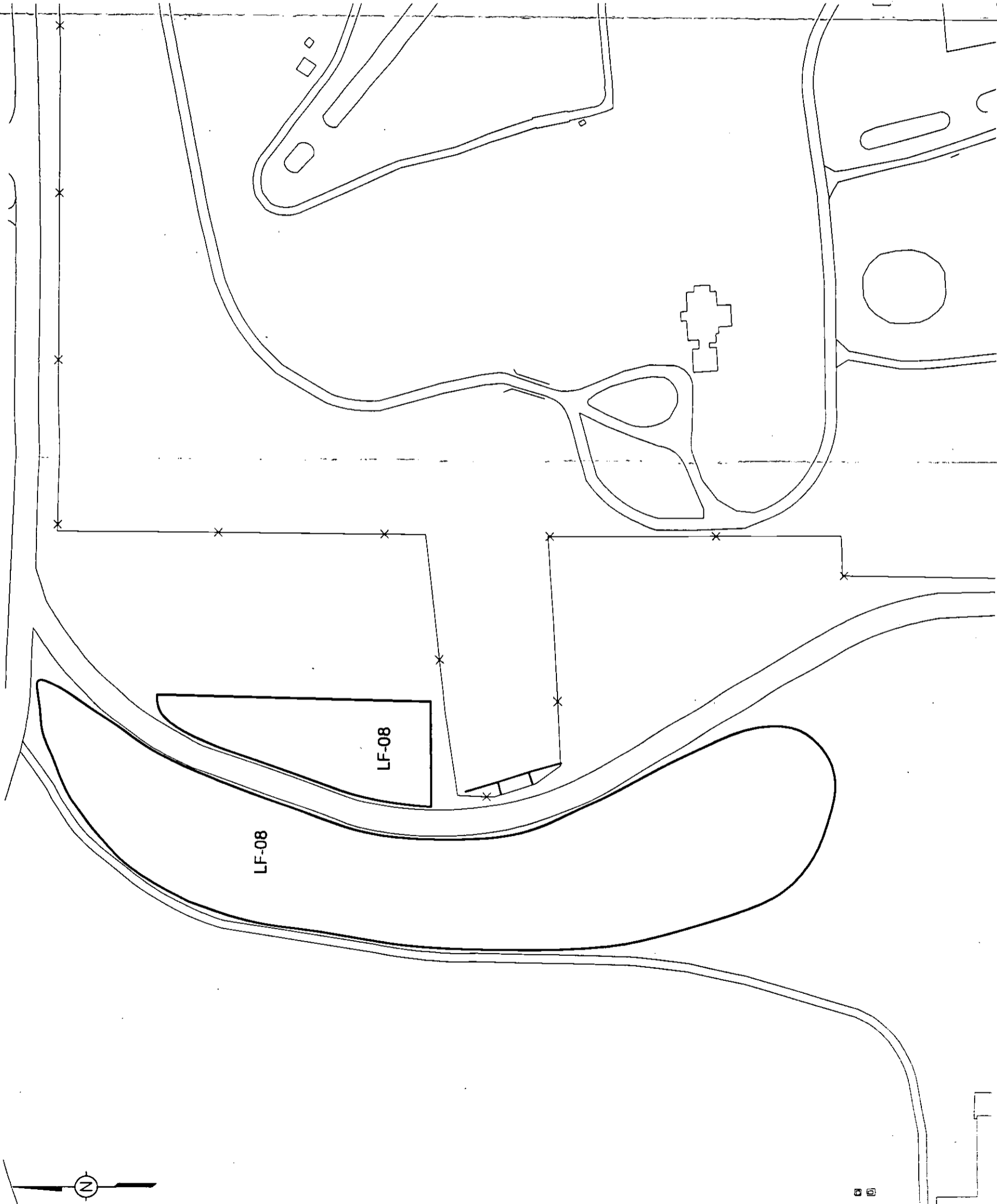
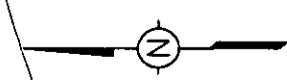


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12-22-21	STARTING DATE: 4/14/00	DATE LAST REV: 04/28/00	DRAFT, CHCK, BY: D. HALL	INITIATOR: M. MAKI	DWG. NO.: 1768579e5.1B8
	DRAWN BY: M. CRAFT	ENGR. CHCK, BY: M. MAKI	PROJ. MGR: W. CARTER	PROJ. NO.: PROJ. NO.	

12:23:16	STARTING DATE: 4/14/00	DATE LAST REV: 04/28/00	DRAFT, CHCK, BY: D. HALL	INITIATOR: M. MAKI	DWG. NO.: 1768579es.190
	DRAWN BY: M. CRAFT	ENGR. CHCK, BY: M. MAKI	PROJ. MGR: W. CARTER	PROJ. NO.: 1768579es.190	



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X FENCE

SCALE: 0 100 200 FEET

FIGURE 1-6
SITE LF-08 LOCATION MAP

NAS FORT WORTH JRB
FORT WORTH, TEXAS



Underlying the Quaternary alluvium are the Cretaceous-aged Goodland and Walnut Formations. Both formations consist of interbedded, fossiliferous, hard limestone and calcareous shale. The Goodland limestone is comprised of white, chalky fossiliferous, thinly to massively bedded, resistant limestone, and gray to yellow brown silty marl. Underlying the Goodland is the Walnut Formation. The Walnut Formation is approximately 20 to 30 feet thick in the vicinity of NAS Fort Worth, consists of indurated fossiliferous limestone interbedded brown sandy clay, thinly bedded fossiliferous clay, fossil shale, and iron-stained earthy limestone. These strata are generally dry, although small amounts of water are occasionally present in the shale and clay units (Radian Corporation [Radian], 1991).

Unconformably underlying the Goodland and Walnut Formations is the Cretaceous-aged Paluxy Formation. Regionally, the Paluxy Formation is divided into upper and lower sand members by a shale unit. The sands in the upper unit of the Paluxy are reported to be fine-grained with shale interbeds. The lower sand member generally consists of two separate and distinct sand strata, but the individual sand beds do not maintain constant thickness or lithology over long distances. The lower part of the Paluxy Formation generally consists of course-grained sand that grades upward into fine-grained sand with variable amounts of shale and limestone. The sandstone composed of fine to course-grained white quartz, is well sorted, poorly consolidated, and crossed bedded. Iron and pyrite nodules occur in the limestone, and lignite is locally present. The Paluxy Formation thickness ranges from 140 to 190 feet, averaging 160 feet in the Tarrant County (Radian, 1991).

1.2.2 Hydrogeology

Three hydrogeologic units exist beneath the NAS Fort Worth that are relevant to subsurface conditions. From the shallowest to the deepest, they are: (1) the Quaternary alluvial aquifer containing unconfined groundwater associated with the Pleistocene terrace and the Trinity River alluvial deposits, (2) an aquitard of predominantly dry limestone of the Goodland and Walnut Formations, and (3) an aquifer in the Paluxy Formation.

The Quaternary alluvial groundwater is found under unconfined conditions at NAS Fort Worth. Isolated areas of apparent semiconfined conditions at transition zones between stratigraphic terrace units were encountered during the field investigation. Low permeability is typical of the alluvial because of the large amounts of clay and silt. However, there are zones of greater permeability in the saturated sands and gravels of former channel deposits. Recharge to the water-bearing sediments is local, from rainfall and infiltration from stream channels and drainage ditches. The direction of the groundwater flow is generally controlled either by bedrock topography or discharge zones at primary or secondary streams. Previous reports indicated that the groundwater flow in these sediments across the facility is generally toward Farmers Branch Creek or eastward toward the Trinity River located at the eastern boundary of the facility.

Groundwater leakage may occur to the underlying Paluxy Formation in areas where the Walnut Formation aquitard is significantly thinned by erosion or eroded away. The Walnut Formation is absent along the station where the West Fork of the Trinity River has removed the unit due to erosion. The unconfined groundwater found in the Quaternary alluvial separated from the

underlying Paluxy Aquifer by the low permeability limestones and calcareous shales where the Goodland and Walnut Formations are present. The aquitard is composed of moist clay and shale layers interbedded with dry limestone beds.

1.2.3 Pre-Design Activities

The following activities will be completed by IT to gain the information needed for the design and construction of the caps and to remove and dispose of the impacted soils at WP-07:

- Borrow studies, including geotechnical sampling and tests patches, will be performed to select a borrow source for the clay layer.
- The building and concrete pads at LF-04 will be sampled for lead, polychlorinated biphenyls (PCB), and asbestos.
- The approved CMS for each site will be reviewed.
- The soil removal report for WP-07 will also be reviewed.

1.3 Scope of Work

In accordance with the AFCEE SOW (AFCEE, 1998), IT will prepare quality and technical work plans and complete the environmental remediation of the following sites located on NAS Fort Worth, Texas:

- Landfill LF-04: Plan and construct an approximate 7-acre RCRA cap.
- Landfill LF-05: Plan and construct an approximately 3-acre RCRA cap.
- Landfill LF-08: Plan and construct an approximately 7-acre environmental cap.
- Waste Burial Area WP-07: Plan and conduct source removal excavation and disposal.

IT shall function as an integral team member in support of the AFCEE mission by efficient management of the DO including accurate, on-time submittals of contract deliverables and timely identification and solution of impediments to successful project execution. In addition, IT shall perform all work in accordance with federal, state, and local statutes and regulations. Remedies shall conform to environmental permit or decision document requirements.

1.3.1 Report Preparation

1.3.1.1 Quality Program Plan

IT prepared a quality program plan (QPP) which contains the following documents:

- Part 1, sampling and analysis plan (SAP) (IT, 1999a), contract data requirement list (CDRL) A002
- Part 2, QSP/CQP, CDRL A003
- Part 3, site safety and health plan (SSHP) (IT, 1999b), CDRL A001.

1.3.1.2 Technical Work Plans

IT prepared the technical work plans, which includes the following parts:

- Part 1, environmental cleanup plan (ECP)
- Part 2, standard operating procedures (SOP) for hazardous materials (CDRL A021).

The ECP includes the following sections:

- Project Activities Work Plan, CDRL A005
- Site Security Plan, CDRL A006
- Excavation Plan, CDRL A007
- Spill and Discharge Control Plan, CDRL A008
- Air Monitoring Plan, CDRL A011
- Surface Water Management Plan, CDRL A012
- Erosion Control Plan, CDRL A014
- Transportation Plan, CDRL A016
- Site Preparation Plan, CDRL A019
- Demobilization and Closure Plan, CDRL A020.

1.3.1.3 Technical Reports

After the completion of field interim remedial activities, IT will prepare a project summary/technical report which documents the activities performed at the site and includes, but not limited to, the following:

- Technical Report, CDRL A023
 - Analytical Data Report Package, CDRL A024

- Environmental Site/Project Summary, CDRL A025
- Production or Delivery Problem Report, CDRL A026
- Still Photographic Records, CDRL A027
- Status Report (Technical), CDRL A028.

IT shall provide engineering data including design plans and specifications, as-built drawings, and equipment or materials specifications (cut-sheets). These documents shall be completed by IT according to the most appropriate industry standard.

1.3.2 Design

IT will review the pre-design documentation and sample analytical results. HydroGeologic is subcontracted to provide a design package for each remedial location based upon the received information. The information provided in the design package will include but not limited to the following:

- Detailed drawings and site specific design plans
- Appropriate and anticipated design calculations
- Design specifications.

During the design, IT Design Engineer and Senior Engineer/Scientist will attend design meetings to discuss 30 and 90 percent designs. The Design Engineer and Senior Engineer/Scientist will attend three additional meetings during the planning and completion of work.

1.3.3 Field Activities

IT shall perform remedial Activities as described in the SOW. These requirements include, but are not limited to, demolition, containment, waste removal, and facility enhancement or restoration. Incidental requirements include mobilization of personnel and equipment; site preparation; testing sampling; site restoration and demobilization of personnel and equipment.

1.3.3.1 Permits

IT shall apply for and obtain all federal, state, local, and other applicable environmental permits, licenses, and certificates to perform and complete each remedial action. These documents are to remain on-site for the duration of all field activities and a duplicate copy will be maintained at the corporate facility handling this DO. IT shall comply with all permit conditions.

1.3.3.2 Pre-Demolition Sampling and Monitoring

The abandoned building facilities located at LF-04 may be sampled for lead, PCBs, and asbestos prior to capping activities. During construction, the air quality will be monitored for dust and particulate concentrations to ensure safe working environment. The details of the sampling activities are described in the field sampling plan (FSP) of this QPP.

1.3.3.3 Facility Demolition

IT shall conduct demolition efforts in conjunction with the removal of outdated facilities and site clearing for cap construction. These facilities include a building, an underground storage tank (UST), and concrete pads. During construction, the air quality will be monitored for dust and particulate concentrations to ensure safe working environment.

1.3.3.4 Site Preparation and Clearance

Site work shall be performed, as necessary, to prepare each location for implementing remedial actions. These actions include, but not limited to, clearing the site, removal of designated structures, excavation and fill, borrowing, hauling, grading, topsoil storage, removal of hidden obstacles, and implementation of erosion control measures.

Additional site preparation activities shall include installation of temporary access roads, parking areas, paths, curbs, fencing and gates for the duration of the activity. IT shall plan, construct, operate, maintain and decommission systems and facilities to control run-on, run-off and transport surface water drainage in accordance with the project design and work plan specifications.

IT shall erect or install support buildings, equipment enclosures, and storage facilities for contaminated materials in accordance with regulatory and design requirements.

Security and access controls shall be implemented to prevent unauthorized entry to the sites and protect wildlife from site exposure.

IT shall plan, construct, operate and maintain physical barriers (caps) over contaminated areas to contain or reduce contaminant migration. These caps will be constructed with natural materials such as clays, gravels, and soils; synthetic materials such as geo-textiles, geo-membrane, or geo-net; or combinations of these materials. Plans to construct, operate, and maintain storm water run-on and run-off control systems shall be implemented in accordance with the project designs and work plan specifications.

1.3.3.5 Removal/Excavation

IT shall obtain the appropriate digging permit in accordance with basic contract special requirements H-11. Field investigations necessary to identify, verify and mark the location of utilities shall be conducted by IT in accordance with industry practice. Sample and analysis of soils and other materials shall be conducted, as necessary, to verify the nature and extent of the contaminants. Excavation activities shall be planned and implemented in a manner that protects the following:

- Existing site utilities, structures, surface features, service operations, monitoring and other types of wells, and the general site environment
- Trees shrubs and other vegetation not in the excavation zone from dust, compaction of soils and physical contact with machines and equipment
- Reasonable measures should be taken to minimize and suppress fugitive emissions of dust, vapors, and other site materials during excavation activities.

Where appropriate, uncontaminated topsoil shall be reserved as a beneficial reuse material.

Excavated materials shall be store in a decommissioning facility constructed, operated, and maintained by IT as per design specifications. All waste storage piles shall be covered to prevent leachate generation, minimize off-gassing of contaminants, and divert storm water run-off. Waste material piles shall remain covered except during active periods of accumulation or loading. The waste material pile covers shall be anchored to sustain the maximum anticipated wind. Water accumulation from storm water run-on and run-off, leachate containment systems, and excavation-dewatering systems shall be properly deposited in accordance with regulatory and design specifications.

Excavations shall be backfilled with material that is uncontaminated, free from debris, and similar to the adjacent soils.

1.3.3.6 Transportation

Waste materials shall be transported in accordance with 49 Code of Federal Regulations 172,173,178,179, and all other applicable local, state, and federal transportation regulations. In addition IT shall comply with the provisions outlined in the transportation plan (CDRL A016).

1.3.3.7 Site Closure and Demobilization

IT shall decontaminate equipment and facilities, decommission facilities as necessary, and restore the site. These activities include removal of temporary facilities and utilities installed to accomplish the remediation work. In addition IT shall shut down the facility by conducting defueling and disposing of system fluids, combustible materials debris and other wastes.

IT shall implement site restoration activities that include, but not limited to, excavation, fill, backfill, hauling grading, compaction, contouring, topsoil replacement and erosion control measures.

1.4 Quality Control Objectives

The objective of this QSP/CQP is to establish procedures that enable project activities to be completed successfully. Project completion will meet AFCEE approval and will meet or exceed established objectives, plans, and specifications. This QSP/CQP addresses the following site-specific topics:

- Project organization chart showing the lines of authority of the QC staff
- Names, duties, authority, and responsibilities of the QC personnel
- Identification of inspections to be performed by types and phases of work, including preparatory, initial, and follow up inspections
- Methods of performing, documenting, and enforcing QC operations of both prime and subcontracted work, including inspection and testing
- Responsibilities and procedures for correcting construction deficiencies
- Procedures for scheduling, reviewing, certifying, and managing submittals
- Authorization of the construction quality control (CQC) System Manager to stop work that does not comply with the contract
- Methods of documenting and tracking nonconformances and variances and corrective actions, and the responsibilities of the QC personnel in implementing these corrective actions
- Procurement QCs
- Training requirements for site personnel

- Field change or modification control
- List of definable features of work.

1.5 Scope of Quality Control Activities

QC activities refer to the actions regularly taken by the project team to improve quality at every phase of the project. This includes provisions for standards, testing, inspections, identification of defects, corrective actions, and documentation controls.

A two-phase QC inspection will ensure adherence to specifications and project requirements. This approach includes inspections of work elements during each of the following phases:

- Preparatory
- Initial
- Follow up.

Section 5, Quality Control of Field and Construction Activities, discusses these phases, as they apply to this project.

Section 2 QC Organization, Responsibilities, and Authorities

The QC program will be implemented to ensure that quality is integrated into every aspect of the project execution. Project quality objectives include meeting technical, regulatory, health and safety, reliability, budget, and schedule commitments in a satisfactory manner. The QC program incorporates the overall system of controls applied to all projects to ensure that finished products meet the quality objectives.

2.1 Construction Quality Control Personnel

The QC team will include the Project Manager, the Site Superintendent, the CQC System Manager, and the Corporate Quality Assurance (QA)/QC Resource Manager. An organizational chart is presented in Figure 2-1, "Project Organizational Chart." The following subsections and Table 2-1 identify the qualifications, responsibilities, reporting requirements, and authorities of these individuals. The Program Manager and the Corporate QA/QC Director will select qualified and experienced individuals for these project-level positions.

Table 2-1: QC Project Personnel Responsibilities and Authorities

Key Positions	Responsibility	Authority
Project Manager	<ul style="list-style-type: none"> • Provide input to program cost engineer for cost and performance reports • Manage funds for labor and materials procurement • Provide information and communicate directly to AFCEE and NAS Fort Worth technical managers • Promptly notify AFCEE and NAS Fort Worth technical managers of unanticipated conditions • Review technical aspects of all task deliverables • Review remediation technology design, testing, and quality assurance plans • Oversee permit applications and approvals as needed • Maintain regular contact with IT program manager and report progress • Manage preparation of specifications for subcontractor and equipment procurement 	<ul style="list-style-type: none"> • Approve remediation technology design, testing, and quality assurance plans • Allocate budget among work elements as identified in the work plan • Approve/disapprove all labor, materials, equipment, and subcontractor charges to project • Establish and enforce work element milestones for the timely completion of delivery order • Approve/disapprove any technical deliverable for each work element • Communicate daily with IT, AFCEE, and NAS Fort Worth management regarding day-to-day progress; direct all technical, construction, and administrative activities as required • Select technical staff

Key Positions	Responsibility	Authority
Site Superintendent	<ul style="list-style-type: none"> Plan and direct resources for all operational work efforts Supervise and complete the performance of construction field operations Ensure adherence to Technical Work Plans, QSP/CQP, Site Safety and Health Plan (SSHP) (IT, 1999b), and SOPs Communicate daily with IT Project Manager Provide information for reporting daily labor and equipment charges Maintain daily activity logs of volumes of soils treated or removed Coordinate logistics between treatment and excavation operations and other operations such as sampling or disposal Ensure adequacy of equipment, supplies, and personnel Direct supervision of field personnel, including subcontractors Recommend corrective action to Project Manager in event of problems in subcontractor performance Execute items required in critical path schedule Ensure that specified inspections and tests be performed 	<ul style="list-style-type: none"> Resolve site problems and inform IT Project Manager of difficulties and support requirements Immediately shut down operation upon observation of safety hazard or upon failure to comply with SSHP, (IT, 1999b) QSP/CQP Immediately take corrective action for any contractor personnel failing to comply with SSHP, QSP/CQP, or SOPs Select equipment to conduct operation in accordance with SOPs and site planning documents Approve/disapprove all materials and labor costs for site operations Record drawing completion
Construction Quality Control (CQC) System Manager or Designee	<ul style="list-style-type: none"> Monitor/audit field/laboratory operations to ensure compliance with QSP/CQP procedures Review all project field/laboratory data Ensure that adequate quality control documentation be provided Ensure that quality control problems be resolved in an expeditious manner and identified to project supervisor and Project Manager Develop quality control plans and inspection system Identify the need for corrective actions and initiating, recommending, and coordinating solutions for project quality problems Concur with the disposition on nonconformance reports and verify satisfactory completion of the corrective actions required by the disposition 	<ul style="list-style-type: none"> Conduct unannounced audits of field/laboratory procedure Immediately stop field/laboratory operations that are not in compliance with QSP/CQP Conduct routine inspections of field activities Ensure submittals are in accordance with SOW CDRLs Verification of record drawings
Site Health and Safety Officer or Designee	<ul style="list-style-type: none"> Monitor field/laboratory procedures to ensure compliance with SSHP (IT, 1999b) Brief all field/laboratory personnel regarding special hazards that may be associated with project operations Monitor the labeling, shipping, and control of hazardous or potentially hazardous samples Monitor field/laboratory safety procedures Conduct daily safety meetings prior to the beginning of each work day Coordinate site health and safety requirements with project superintendent and Project Manager Collect all required air and personnel monitoring data Report all health and safety monitoring results to Certified Industrial Hygienist (CIH) Ensure maintenance of all health and safety monitoring and personnel protective equipment 	<ul style="list-style-type: none"> Immediately shutdown field/laboratory operations that deviate from SSHP (IT, 1999b) Conduct unscheduled safety audits

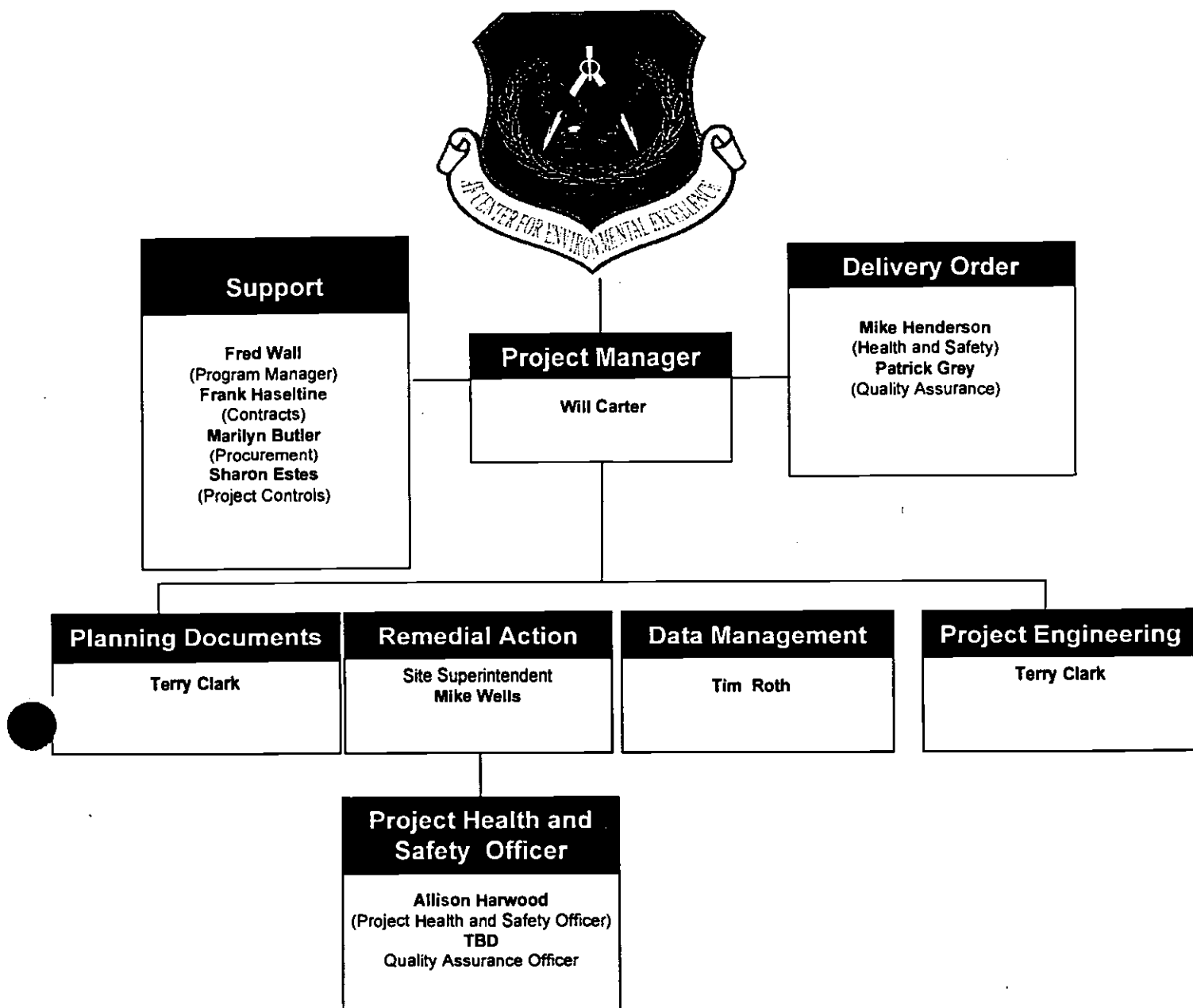


FIGURE 2-1: PROJECT ORGANIZATION CHART

2.1.1 Project Manager

Day-to day management of project resources and activities will be the primary responsibility of the Project Manager. Success of the project will be measured by achievement of project objectives, goals, and safe completion of the project on schedule and within the established budget.

The Project Manager will support the implementation of the QSP/CQP by effectively communicating the QC program policies, objectives, and procedures to all project personnel. The Project Manager will serve as the representative of the Program Manager and will coordinate and communicate with the AFCEE representative. The Project Manager will report directly to the Program Manager.

2.1.2 Construction Quality Control System Manager

The CQC System Manager will report directly to the responsible Corporate QA/QC Resource Manager. The CQC System Manager will be responsible for implementing the QC plans and verifying that the QA and data quality objectives (DQO) for the project are being met. This individual will also be responsible for informing the responsible QA/QC Resource Manager of any site-specific problems. Project staff will assist the CQC System Manager in monitoring, controlling, and documenting the quality of the on-site activities. Because of the short duration of the field activities, the CQC System Manager may delegate some of the field QC to the Site Superintendent.

The CQC System Manager will be authorized to stop work on all or any project work activity because of nonconformance with this QSP/CQP or other project requirements. All project personnel will be encouraged to discuss any concerns with the QC technical staff. In the event that the CQC system Manager or Site Superintendent is informed of and/or detects and incident of project nonconformance, the CQC System Manger will perform an initial investigation, determine any corrective actions required, document the incident, and report the incident to the Project Manager.

2.1.3 Site Superintendent

The Site Superintendent will report directly to the Project Manager and will be responsible for the day-to-day supervision of the on-site activities. The Site Superintendent will direct the project resources on site to complete daily work activities and will communicate project progress to the Project Manager. The Site Superintendent's involvement in QC will include communicating the necessity of quality in performance of all remedial activities to the on-site project staff.

Section 3 Project Plans and Submittals

All project plans and submittals will receive a technical review before final approval by the Project Manager. The CQC System Manager will oversee the submittal process and schedule reviews so that project submittals can be approved before the required submittal date. Project submittals are detailed in the SOW CDRL.

3.1 Submittal Verification and Transmittal

Submittals will be reviewed, approved, and dated by the appropriate project team members. Field changes to approved work plans will be documented and will be subject to controls commensurate with those applied to the original work plans. Field changes that might affect the remedial action will be approved by the organization that approved the original document or by an approved alternate designated by the Project Manager.

3.2 Submittal Procedures

IT will prepare submittals as required by the SOW. Each submittal will be complete and in sufficient detail to allow ready determination of compliance with the contract requirements. Prior to submittal, the IT CQC System Manager will check and approve all items. Proposed deviation from the contract requirements will be clearly identified. Submittals will include but not be limited to work plans, photographs, meeting notes, waste profiles, and technical reports.

3.2.1 Scheduling

Submittals covering component items forming a more inclusive document or interrelated items will be scheduled to be coordinated and submitted concurrently. In accordance with the approved baseline schedule shown in Figure 3-1, adequate time will be allowed, when possible for AFCEE review and approval of all submittals.

3.2.2 Deliverables

IT will submit the appropriate number of copies to the appropriate individuals in accordance with the SOW.

3.3 Project Record Documents

In process record documents will be stored on site until complete. Once the record documents are finalized, they will be shipped to the Knoxville office for temporary storage.

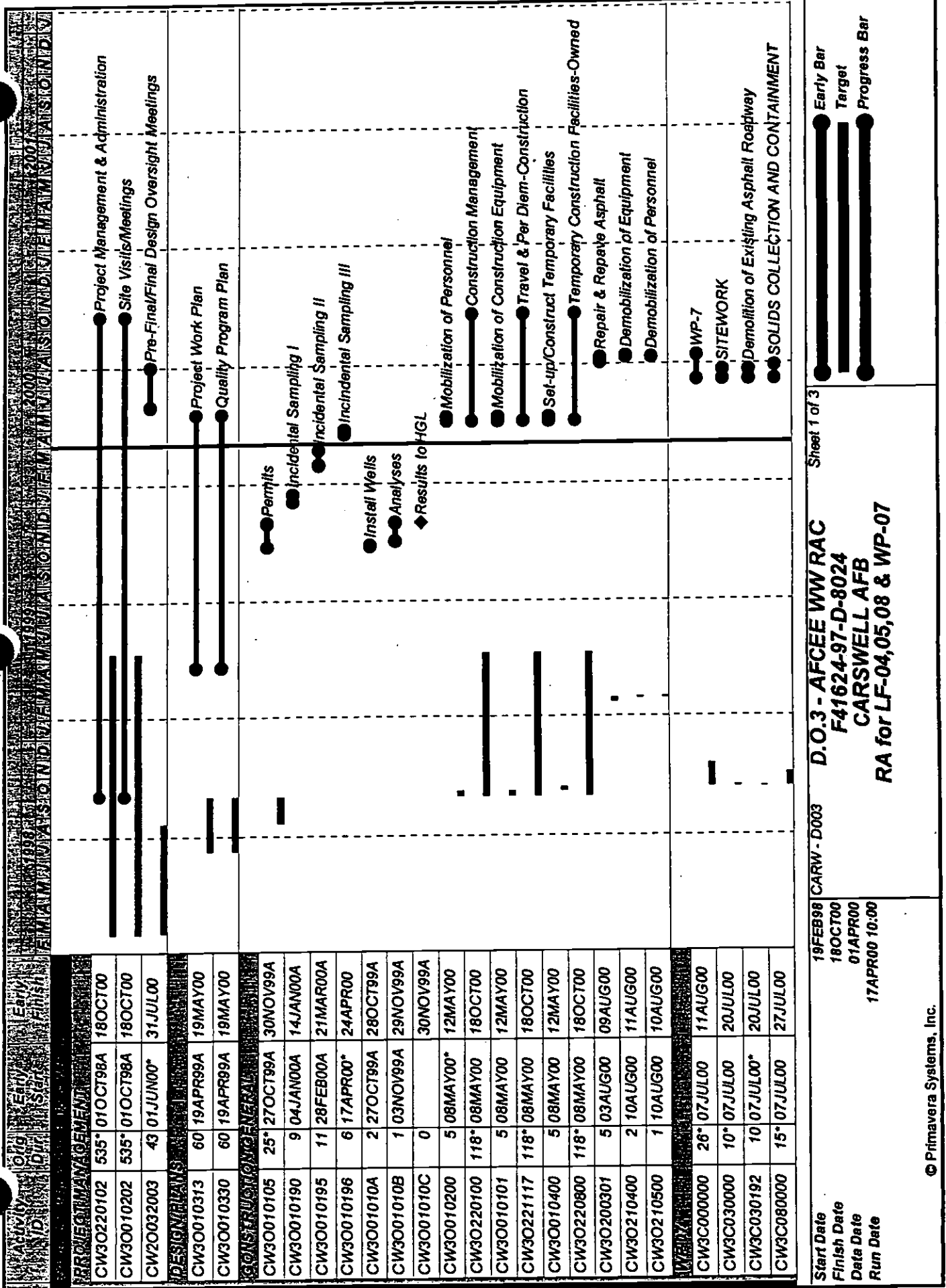
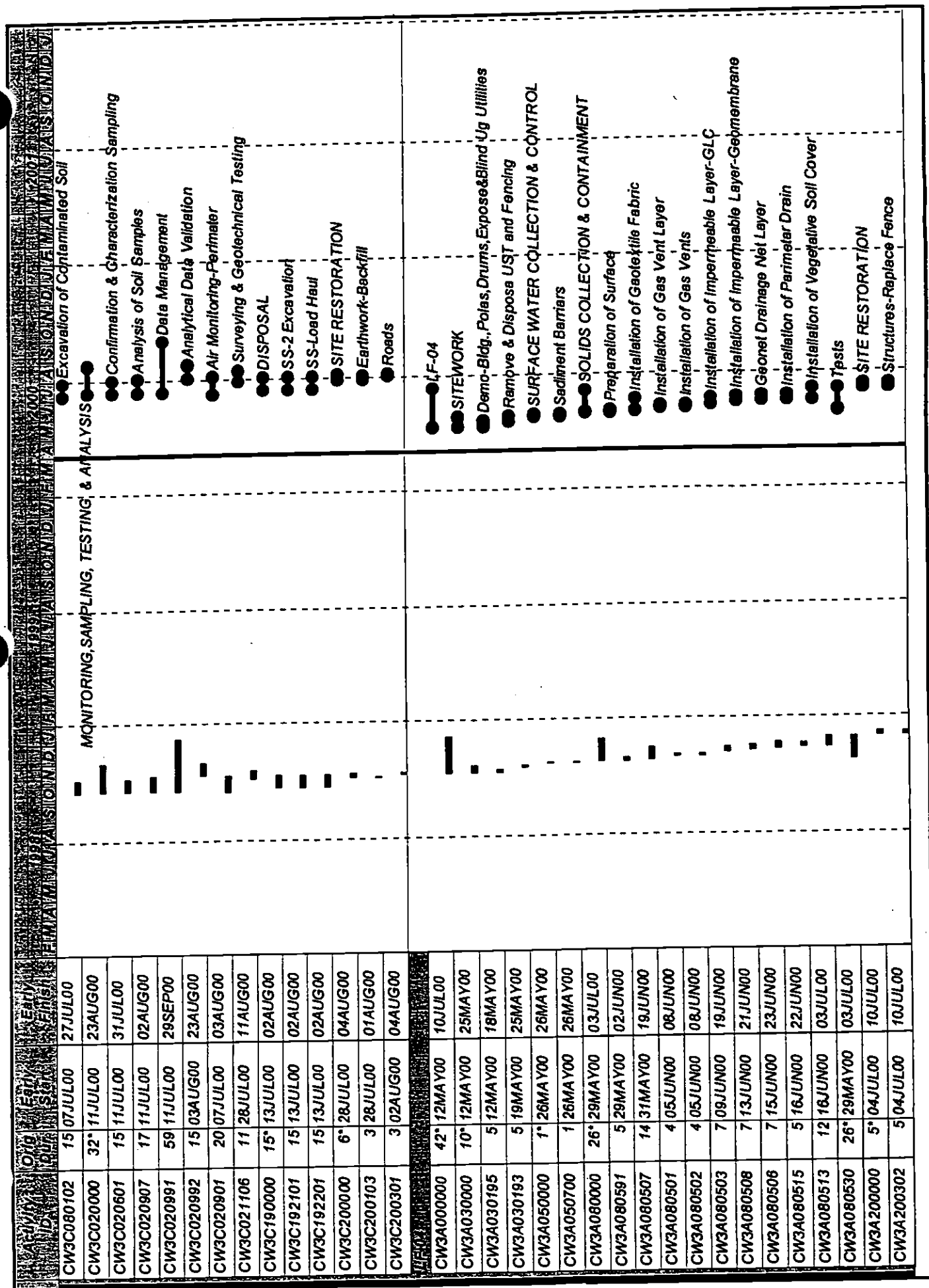


FIGURE 3-1



Section 4 QC of Design Activities

4.1 Design Controls

4.1.1 Design Documents of Others

IT will review the design document completed by Hydro-Geologic to determine if there are any conflicts between the design documents and the work plans and restoration actions to be performed by IT. As a minimum, these reviews will include design drawings and specifications.

The review of the design document will include value engineering concepts and constructability evaluation. When a conflict arises between the design document and IT work plans, IT will document the conflict and consult with the originator and include the matrix of conflicts in each design submittal.

4.1.2 Internal Design Controls

Design activities performed by IT will be controlled so that efficiency, cost-effectiveness, technical accuracy, practicality, constructability, quality of documents, and other factors affecting the design of the interim remedial action project are maintained in a satisfactory manner.

4.1.3 Calculations, Drawings, Logs, and Tables

The results of the measurement process frequently are presented in tables, logs, and figures, and can be included as input in calculations. When data is transcribed from one location to another or when the data are mathematically manipulated and presented as a graph, figure, or used in a drawing, the data presentation will be reviewed and verified in the new form. IT has defined procedures for the review and verification of calculations, drawings, logs, and tables that appear in reports or submittals or are used in design or construction activities.

Two types of verifications are performed: transcriptional and nontranscriptional checking.

4.1.3.1 Transcriptional Checking

Transcriptional checking is used to describe the process of verification of the transcription of information. This process does not require that the verification be performed by a peer but on that the originator of the table verify the transcription process. The procedure requires the checker to overmark every correct entry header, figure or table number, and drawing title block with a yellow highlighter. Incorrect information is crossed out and the correct information

provided in red ink. The corrected drawing, table, or log becomes the "checkprint" that is resubmitted for correction. The process is continued until all information is verified.

4.1.3.2 Nontranscriptional Checking

Nontranscriptional checking is a peer review process whereby the assumptions, equations used, and results are verified against industry standards and professional practices. The assigned reviewer must be of a technical level equivalent to or higher than the originator. The documentation of the verification process (verifications in yellow highlighter and corrections in red ink) is identical to transcriptional checking; however, both the originator and the checker must agree any corrections or modifications to. If the parties cannot come to an agreement, then the review is passed to the next higher organizational level for resolution.

4.2 Record Drawings

Record or as-built drawings will be maintained for the interim remedial action project. The record drawings will be marked up (redlined) to show all changes to the "For Construction" drawings. Supporting documentation such as field work variances (FWV) will be included as an attachment to the drawing or by reference to indicate approval of the changes. A copy of the FWV form is included in Appendix A. Completed marked-up drawings will be returned to the originator for incorporation in the final "Record" drawings to be submitted with the technical report.

Section 5 QC of Field and Construction Activities

Quality of on-and off-site project activities will be controlled for each definable feature of work associated with this project. The following ten definable work tasks will be performed under this project:

1. Site mobilization
2. Predemolition sampling
3. Site preparation
4. Building demolition and UST removal
5. Containment and capping installation
6. Excavation, transportation, and disposal of solid waste
7. Post soil removal confirmation sampling (as required)
8. Excavation backfill
9. Site restoration
10. Site closure and demobilization operation and maintenance.

Compliance with the work plans and project requirements will be monitored using the following three-phase inspection approach:

- Preparatory inspections will be performed before beginning each DO definable feature of work.
 - A review of submittal requirements and other contract requirements with project personnel
 - Verification that provisions have been made to provide required field control testing
 - Examination of the work area to ascertain that all preliminary work has been completed
 - Verification of field dimensions, lines, and grades
 - Physical examination of materials and equipment
- Initial inspections will be performed at the beginning of each DO definable feature of work. A representative sample of work will be observed to verify the work is in compliance with the specified requirements. As a minimum the following attributes will be addressed:
 - Review preparatory inspection documents.

- Establish quality of workmanship and inspection levels.
- Resolve conflicts.
- Verify work conforms to safety plans and hazard analysis.
- Verify required tests and control measures.
- Follow-up inspections will be performed at appropriate intervals as the work progresses on any particular task to verify compliance with contract requirements. The inspections will continue until completion of that work task. Final follow-up checks will be conducted, and all deficiencies will be corrected before the start of additional work tasks that may be affected by the deficient work.

QC in IT field operations will be ensured through adherence to the QSP/CQP and corporate QA policies and project requirements. All program and corporate policies concerning field activities, cost accounting, resource utilization, and performance monitoring in the field will be followed unless otherwise directed by the AFCEE representative.

5.1 Field Inspections and Tests

The field inspections planned for this project will be primarily visual but may include measurements of materials and equipment, techniques, and final products. Inspections will be performed to confirm that a specific guideline, specification, or procedure for the activity has been successfully completed. In addition, materials will be inspected for compliance with contract requirements.

IT will perform the specified or required tests to verify adequate control measures that will provide a product that conforms to the contract requirements. IT will procure the service of an industry-recognized analytical laboratory approved by the Contracting Officer. IT will perform the following activities and record and provide the following data:

- Verify that the testing procedures comply with the contract requirements.
- Verify that the facilities and testing equipment are available and comply with the testing standards.
- Check test instrument calibration data against certified standards.
- Verify that the recording form, including all of the test documentation requirements, have been prepared.

- Other test will include, but not limited to, classification of soils, backfill compaction tests, moisture density, coefficient of permeability, and field nuclear density.

The results of all tests conducted, both passing and failing, will be included in the daily QC report. This report will include an assessment of how the failing test will affect work and what will be done to correct the deficiency. Inspections and tests will be performed during field work as part of the QC activities and project requirements.

The two phases of inspections will be extended to each definable work task during execution of the project activities. Two-phase inspection checklists are provided for guidance in Appendix A. Completed checklists will be included with the QC daily report.

5.2 Inspection, Measurement, and Test Equipment

When tools, gauges, instruments, and measuring and test equipment are used for activities affecting quality, both in the laboratory and in the field, the calibration and use of such equipment will be controlled depending on its criticality. As applicable, the control program will include the following:

- Identify, calibrate, and adjust all inspection, measuring, and test equipment and devices at prescribed intervals or prior to use against certified equipment that has already been calibrated to nationally recognized standards. Where no such standards exist, the basis used for calibration will be documented.
- Establish, document, and maintain calibration procedures, including details of equipment type, identification number, location, frequency of checks, check method, acceptance criteria, and the action to be taken when results are unsatisfactory.
- Ensure that inspection, measuring, and test equipment be accurate and precise.
- Identify inspection, measuring, and test equipment with a suitable indicator or approved identification record to demonstrate the calibration status.
- Maintain calibration records for inspection, measuring, and test equipment.
- Assess and document the validity of previous inspection and test results when inspection, measuring, and test equipment is found to be out of calibration.
- Ensure that the calibrations, inspections, measurements, and tests be conducted under suitable environmental conditions.

- Handle, preserve, and store inspection, measuring, and test equipment to in a manner that maintains equipment accuracy and fitness for use.

5.3 Inspection and Test Status

The status of inspection and test activities will be identified either on the items or on documents traceable to the items where it is necessary to validate that the tests and inspections have been performed. Status will be maintained through the use of indicators such as physical location and tags, markings, stamps, inspection records, QC daily reports or other suitable means. Unless instructed otherwise, the CQC System Manager and QC staff will be authorized to apply and remove these status indicators.

5.4 Documentation and Reports

The QC daily report will serve as the basic document for recording the effectiveness of the QC program. The QC daily report will provide detailed information regarding job site location, work performance, weather conditions, types and results of inspections, locations and descriptions of deficiencies, methods of deficiency corrections, and other comments. The QC daily report will be completed and signed by the CQC System Manager or delegate. All tasks will be documented throughout the project in order to maintain an accurate account of site activities and costs. Legible copies of these reports will be filed on site and will be available upon request. All documents will be identified with the following:

- Date
- Contract name and number
- Contractor name and address
- Number and title of document
- Signature of originating individual.

Section 6 Field Change/Modification Control

A modification is required for changes that affect project requirements. A modification may be necessary because of a changed condition on site that could alter the performance of work from the negotiated DO or because of a request by the AFCEE representative for additional work that was not originally identified. The Project Manager or the AFCEE representative may initiate a change notice. When a modification to the work is required, the Project Manager will submit schedule and cost impacts for each proposed change as quickly as possible after identification of the changed condition.

The following summarizes the steps for initiating a DO modification resulting from a changed condition in the field:

- The Site Superintendent will immediately notify the Project Manager of any changed conditions.
- The Project Manager will assign the task of preparing a detailed description of the changed condition, the anticipated effect on performance, and the anticipated effect on the cost of the task or DO.
- A written notification that a changed condition has occurred or will occur will be provided to the AFCEE representative after review and concurrence by the Project Manager.
- A detailed cost estimate for the change will be prepared and submitted to the AFCEE representative.
- The estimated cost of performance will not be exceeded without prior written authorization from AFCEE via a DO modification.

Section 7 Nonconformance/Corrective Action

Nonconforming items and activities are those that do not meet the project requirements. When such a condition is identified, the CQC System Manager, with assistance from the Site Superintendent, will implement a corrective action program as follows:

- Document the nonconforming item or activity and determine the cause of the nonconformance, the effect on project performance, and the effect on the integrity of completed work.
- Use the nonconforming item or results of the nonconforming activity if the nonconformance does not affect quality, or correct or replace the nonconforming item or repeat the activity in the most efficient and effective manner.
- Verify and document that the corrective action is successful.

7.1 Documentation of Nonconforming Items

The CQC System Manager will document any nonconforming item on both the QC daily report and on the nonconformance report form included in Appendix A. This report will clearly state what is not in compliance, the date the nonconformance was originally discovered, and the date corrective action was completed. A copy of the nonconformance report will be included in the QC daily report, as appropriate.

7.2 Implementation of Corrective Action

The CQC System Manager will be authorized to stop work until corrective actions are implemented. In some cases, the corrective action may be obvious and may be implemented immediately upon identification of the nonconformance. Other situations may require additional input from technical and/or operations staff, additional equipment and/or materials, or changes in existing structures or completed work. The CQC System Manager will not allow work to be added to or built upon nonconforming work unless the AFCEE representative concurs that the correction can be made without disturbing continuing work.

7.3 Verification and Documentation of Corrective Action

The CQC System Manager or delegate will conduct a follow-up inspection to verify successful completion of corrective actions for nonconformances. The QC daily report will reflect all completed corrective actions. The CQC System Manager will also update the nonconformance report form describing the corrective action and the date such action was completed. Recurring nonconformances of similar nature will be investigated to determine the root cause of the problem and to eliminate or minimize future occurrences.

Section 8 Quality Assurance Auditing

The QA auditing and corrective action program will provide a mechanism for QA personnel to perform planned and documented QA audits. It will also provide an objective and independent evaluation of compliance with established corporate policies and the CQP.

The CQC System Manager may conduct internal audits, and corporate QA personnel with the cooperation of the affected project personnel may conduct external audits. The QA auditor will review the CQP and related document before the audit and will inform the DO Manager of the impending audit with written notice. An audit scope of work and checklist will be prepared that at a minimum will address the following topic areas:

- Project organization
- Personnel qualifications and training
- Operating procedures
- Procurement
- Document control and record keeping.

A report will be written for each audit and will discuss the scope, findings, and recommendations for corrective action. Copies will be given to the DO and Program Managers. Deficient items will be monitored by the CQC System Manager to verify that corrective actions be taken within the schedule agreed upon by the DO Manager. Reports on outstanding audit findings will be issued at appropriate intervals during the project. Findings that are nonconformances with respect to project specifications will be documented in the QC daily report the day they are discovered. The audit report will be submitted to the Contracting Officer's Representative upon completion.

Section 9 Purchasing Quality Assurance

9.1 Requisition and Purchase Order

IT has established a program for controlling subcontracted services and the procurement of items, including measuring and test equipment, and subcontracted services. This program will ensure that procured items and services meet established requirements and perform as specified in written procurement documents. Prospective suppliers will be evaluated and selected on the basis of the specified criteria.

9.2 Control of Procurement Document Content

The procurement documents will include provisions for the following, as applicable to the scope of work or services:

- **Scope of Work.** The procurement documents will include a statement of the scope of work to be performed by the Subcontractor.
- **Technical Requirements.** Technical requirements will be specified. Where necessary, these requirements will be specified by reference to specifications, codes, regulations, procedures, QA program documents, and SOW requirements that describe the services to be furnished. The procurement documents will provide for identification of inspections, verification, and acceptance requirements for monitoring and evaluating the supplier's performance.
- **QA Program Requirements.** As applicable, the procurement documents will require that subcontractors have a documented quality system that implements portions or all of the requirements of this QSP/CQP. The extent of the quality system applied to the supplier will depend on the type and use of the service being procured.
- **Right of Access.** As applicable, the procurement documents will provide for access to the suppliers' facilities and records for inspections or audit by authorized representatives.
- **Documentation Requirements.** The procurement documents will identify both the submittal time and the documentation required for information, review, or approval.

The Procurement Department, with appropriate QC input, will review the procurement documents and changes to ensure that documents transmitted to the prospective supplier include adequate requirements, performance standards, and quality criteria.

A review of changes and their effects will be completed prior to transmittal to the prospective supplier. During this review, the Procurement Department will evaluate whether appropriate requirements are specified; determine whether additional or modified performance criteria are needed; analyze the exceptions or changes requested or specified by the supplier; and determine the possible effects of such changes on the intent of procurement documents or quality of the service to be provided.

9.3 Supplied Products

The QC staff will conduct receipt inspections and verification of purchased items. The controls will provide for the following, as applicable:

- Verification that the items received were the items ordered
- Inspection for evidence of breakage, damage, or other function-related problems
- Verification that documentation is received and is acceptable
- Verification that the items conform with the supplier's published requirements.

9.4 Handling, Storage, Packaging, and Delivery

The handling, storage, packaging, and delivery of items will be controlled to prevent damage or deterioration. Procurement documents will include the following:

- Requirements for sellers to establish special procedures, when necessary, to ensure cleanliness, identification, and proper handling
- Requirements for the preparation of items for shipment, as necessary, to prevent damage or deterioration of the supplied items
- Requirements for material and equipment storage instructions, when specified, to be available at the site well in advance of the arrival of material/equipment.

Section 10 Training

Training activities will be conducted, as necessary, to qualify those personnel performing tasks affecting quality. The extent of the training will be commensurate with the following: scope, complexity, and nature of the activity and education, experience, and proficiency of the as signed individual.

Training will include an explanation of the extent and sources of variability in the tools and processes used in the activity. Training will emphasize correct completion of work and will clarify the basis of quality requirements.

Personnel will be indoctrinated in the following subjects as they relate to a particular function:

- General criteria, including technical objectives, requirements of the applicable codes and standards, and company procedures
- Applicable quality requirements
- Job responsibilities and authority.

Section 11 References

AFCEE, see U.S. Air Force Center for Environmental Excellence.

IT Corporation (IT), 1999a, *Draft Quality Program Plan Part 1, Draft Field Sampling Plan, NAS Fort Worth, Texas*, IT Corporation, Knoxville.

IT Corporation (IT), 1999b, *Draft Quality Program Plan Part 3, Draft Site Safety and Health Plan, NAS Fort Worth, Texas*, IT Corporation, Knoxville.

IT Corporation (IT), 1998, *Technical and Business Proposal for Remedial Action for IRP Site NAS Fort Worth, Texas*, IT Corporation, Knoxville, Tennessee.

IT Corporation (IT), 1997, *NAS Fort Worth Resource Conservation and Recovery Act Facility Investigation, NAS Fort Worth, Texas*, IT Corporation, Knoxville.

U.S. Air Force Center for Environmental Excellence, 1998, *Statement of Work for Remedial Action for IRP Site NAS Fort Worth, Texas*, Brooks Air Force Base, Texas.

Radian Corporation (Radian), 1991, *Carswell Air Force Base, Final Report - October 1991, Remedial Investigation Report for the East Area*, October.

Appendix A

Checklists and Forms

INTERNATIONAL
TECHNOLOGY
CORPORATION

FIELD WORK VARIANCE FORM

VARIANCE NO. _____

PROJECT NO. _____

PAGE _____

OF _____

PROJECT NAME _____

DATE _____

VARIANCE (INCLUDE JUSTIFICATION):

APPLICABLE DOCUMENT:

CC:

REQUESTED BY:

DATE

APPROVED BY:

DATE

Project Manager

DATE

Quality Assurance Officer



INTERNATIONAL
TECHNOLOGY
CORPORATION

Nonconformance No:

Linked w/Variance No (if applicable):

Date of Issue:

Page 1 of 1

Project Name:

Project Number:

- Nonconformance Report -

I. Summary of the Change:

Identified by:

Date:

II. Nonconformance Requested:

To Be Performed by:

Date:

To Be Verified by:

Date:

III. Justification for Nonconformance:

IV. Applicable Document/Work Plan:

Distribution List:

- Signatures -

Requested by:

Date

Approved by:

Date

Proj Manager Approval:

Date

QA Approval:

Date

**DAILY QUALITY CONTROL REPORT**

REPORT # 99-		Date:	Day:
CONTRACT # F41624-97-D-8024-D00003			
WEATHER CONDITIONS		Project Title: Remedial Design and Remedial Action for Landfills LF-04, LF-05, LF-08, and Waste Burial Pit WP-07	
Precipitation: inches	Temperature (°F) Min.		
Wind: mph	Max.	Project Location: NAS Fort Worth, Texas	
Sky:			

1. **On-site Contractor/Subcontractors and areas of responsibility:**

TASK	WBS	JOB DESCRIPTION/TRADE	# EMPLOYEES	EMPLOYER

2. **Work Performed Today: (Indicate location and description of work performed by prime and subcontractors) Subcontractor daily reports are attached.**3. **Quality Control Activities Performed:**

Preparatory Inspections: (Identify feature of work and attach minutes.) Inspection documentation is attached.

Initial Inspections: (Identify feature of work and attach minutes.) Inspection documentation is attached.

Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements and corrective actions taken when deficiencies are noted.) Inspection documentation is attached.

4. **Test Collected/Performed:** (Identify test requirements by paragraph number in specification and/or sheet number in plans.) Supporting documentation is attached.
-
-

5. **Test Results:** (Identify test requirements by paragraph number in specification and/or sheet number in plans.) Supporting documentation is attached.
-
-
-

6. **Summary of site waste generation and transportation and disposal activities:** Supporting documentation is attached.
-
-
-

7. **Submittals Reviewed:**

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. **Off-site Surveillance Activities, Including Action Taken:**
-
-
-

9. **Job Safety:** (Daily Report submitted by the SSO) Health and Safety Report and supporting documentation is attached.
-
-
-

10. **Instructions received or given:**
-
-
-

11. **Conflict(s) in plans and/or specifications:**
-
-
-

12. Delays encountered:

13. Additional Comments:

On behalf of the Contractor, I certify this report is complete and correct and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

IT QC System Manager

Date

DAILY QUALITY CONTROL REPORT – ATTACHMENTS

May include: Subcontractor's daily report
Health and Safety Report with attachments
Laboratory results (analytical and soils)
Equipment Inspections
Chains-of-Custody
Field maps showing work initiated/completed
QC inspection checklists



Contract No:
F41624-97-D-8024-D00003

Location: NAS Fort Worth, Texas

Inspection Date:

Feature of Work:
Inspection: Preparatory

Specifications:

Requirements/Reference	Hold Pt. (Yes/No)	Org.	Initials	Remarks
------------------------	----------------------	------	----------	---------

1.				
2.				
3.				
4.				
5.				
6.				
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11.				
12.				
13.				

Identification of Participating Organizations

IT Site Personnel

IT - CQC System Manager/Site Superintendent _____



IT CORPORATION

A Member of The IT Group

Contract No:

F41624-97-D-8024-D00003

Location: NAS Fort Worth, Texas

Inspection Date:

Feature of Work:

Inspection: Initial

Specifications:


Requirements/Reference	Hold Pt. (Yes/No)	Org.	Initials	Remarks
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Identification of Participating Organizations

IT Site Personnel

IT – CQC System Manager/Site Superintendent

519 79

 IT CORPORATION <small>A Member of The IT Group</small>			Contract No: F41624-97-D-8024-D0003	
Location: NAS Fort Worth, Texas			Inspection Date:	
Feature of Work: Inspection: Follow-up			Specifications: <i>Statement of Work (SOW)</i> and Environmental Cleanup Plan (ECP)	
Requirements/Reference	Hold Pt. (Yes/No)	Org.	Initials	Remarks

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Identification of Participating Organizations

IT Site Personnel

IT - CQC System Manager/Site Superintendent

Final Quality Program Plan Part 3

Site Safety and Health Plan

*Landfills LF-04, LF-05, and LF-08 Capping and Waste
Burial Area, WP-07 Excavation*

NAS Fort Worth (Former Carswell AFB), Fort Worth, Texas

AFCEE Contract No. F41624-97-D-8024

Delivery Order 003

IT Project No. 774902

May 2000



IT CORPORATION

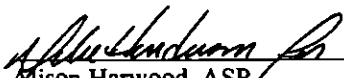
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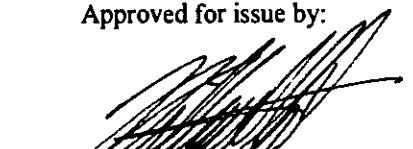



3207 North Road
Brooks AFB, Texas 78235-5363

Prepared by:


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Health and Safety Coordinator

Approved for issue by:


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Mike Henderson, CIH
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Health and Safety Plan Approvals and Acknowledgement

Approvals

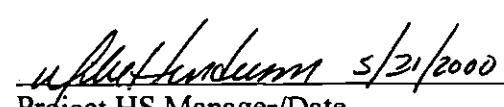
I have read and approved this SSHP with respect to project hazards, regulatory requirements, and IT procedures.

Project Name Carswell AFB

Project Number 779402


Project Manager/Date

5/30/00


Project HS Manager/Date

5/31/2000

Acknowledgements

This SSHP has been provided to the Site Supervisor. I acknowledge my responsibility to provide the Site Supervisor with the equipment, materials, and qualified personnel to implement fully all safety requirements in this SSHP. I will formally review this plan with the HS Staff every six months until project completion.

Project Manager 

Date

5/31/00

I acknowledge receipt of this SSHP from the Project Manager, and that it is my responsibility to explain its contents to all site personnel and cause these requirements to be fully implemented. Any change in conditions, scope of work, or other change that might affect worker safety requires me to notify the Project Manager and/or the Health and Safety Manager.

Site Supervisor _____

Date _____

NUMBERS TO KNOW**EMERGENCY NUMBERS**

NAS Fire and Emergency Services	626-3786
Fire Department – River Oaks	626-1991
NAS Fort Worth Information	(817) 782-5000
Hospital - Osteopathic Hospital	(817) 731-4311
Fire Dept. - NAS Fort Worth	782-6336
Police - NAS Fort Worth	782-5200
Sheriff	844-1212
U.S. EPA (24-hour hotline)	(800) 424-8802
Chemtrec	(800) 424/9300
National Poison Control Center	(404) 588-4400
IT Knoxville	(865) 690-3211
Mike Dodyk - AFBCA Base Office	(817) 782-7167

UTILITY NUMBERS

Electric Co.	(817) 336-9454
Water Co.	871-8300/871-8294
Gas Co. Lone Star	(800) 725-1252

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Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygiene
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AIDS	Acquired Immune Deficiency Syndrome
BZ	breathing zone
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
dBA	decibels
DOD	U.S. Department of Defense
DOL	U.S. Department of Labor
DRMO	Defense Reutilization and Marketing Office
EPA	U.S. Environmental Protection Agency
EZ	exclusion zone
H&S	health and safety
HBV	hepatitis B virus
HEPA	high-efficiency particulate air
HIV	human immunodeficiency virus
IT	IT Corporation
mg/kg	milligrams per kilogram
MSDS	Material Safety Data Sheet
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PE	professional engineer
PEL	permissible exposure limit
PM	project manager
POL	petroleum, oil, and lubricants
PPE	personal protective equipment
SEIR	Supervisor's Employee Injury Report
SSHO	site safety and health officer
SSHP	site safety and health plan
SVE	soil vapor extraction
TLV	threshold limit value
TWA	time-weighted average

Section 1 Introduction

1.1 Objectives

The Air Force Center for Environmental Excellence (AFCEE) has retained IT Corporation (IT) to cap various landfills, demolish and dispose of the former radar installation and excavate hot spots areas of phthlate contaminated soils at the Carswell Air Force Base (AFB) in Fort Worth, Texas.

The objective of this plan is to provide a mechanism for the establishment of safe working conditions at the site. The safety organization and health and safety (H&S) procedures have been established following an analysis of potential hazards at the site. Specific hazard control methodologies have been evaluated and selected in an effort to minimize the potential of accident or injury.

All site operations will be performed in accordance with applicable state, local, and IT corporate regulations and procedures, Occupational Safety and Health Administration (OSHA) requirements, and U.S. Department of Defense (DOD) guidelines. All IT employees and IT subcontractors must comply with the requirements of this plan.

1.2 Facility and Location Description

Carswell Air Force Base (AFB) was first activated in 1918 as a combat training school. Pursuant to the Defense Base Closure Act and Realignment Act of 1990, Carswell AFB was selected for closure and associated property disposal during Round II Base Closure Commission deliberations. The Carswell AFB Disposal and Reuse Final Environmental Impact Statement was filed with the U.S. Environmental Protection Agency on April 29, 1992. A National Environmental Policy Act Record of Decision was issued on March 31, 1993. The Base officially closed on September 30, 1993.

The Air Force Base Conversion Agency is identifying and prioritizing the disposal and reuse of each parcel, based on market demand and reuse by the local community. Most of the property will be transferred to the U.S. Department of the Navy; therefore, Carswell AFB has been designated as the Naval Air Station (NAS) Fort Worth.

The Base is located in north central Texas in Tarrant County, 8 miles west of downtown Fort Worth (See Figure 1-1). The Base property totals approximately 2,555 acres and consists of the main base and two noncontiguous parcels. The main Base comprises 2,264 acres and is bordered by Lake Worth to the north, the West Fork of Trinity River and Westworth Village to the east, Fort Worth to the northeast and southeast, White Settlement to the west and southwest, and AF Plant 4 to the west. The area surrounding NAS Fort Worth is mostly suburban, including the residential areas of the cities of Fort Worth, Westworth Village, and White Settlement. The land

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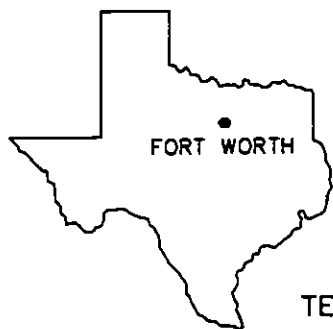
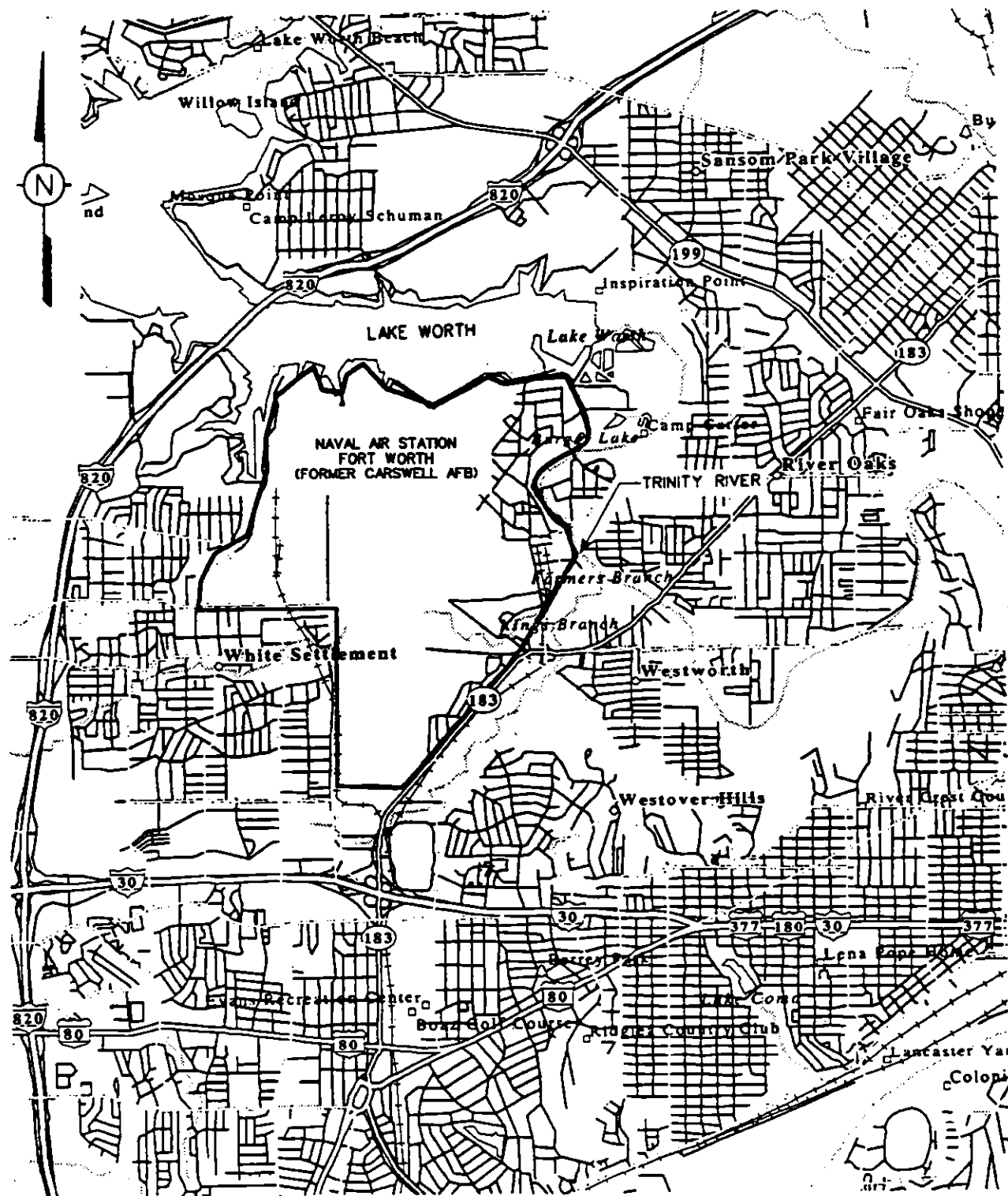


FIGURE 1-1
NAS FT. WORTH LOCATION
SITE MAP

NAS FORT WORTH JRB
FORT WORTH, TEXAS

uses west of the Base are predominantly industrial. These include supporting commercial centers, AF Plant 4, and an industrial complex in White Settlement.

1.3 Policy Statement

It is IT's policy to provide a safe and healthful work environment for all its employees. IT considers no phase of operations or administration to be of greater importance than injury and illness prevention. Safety takes precedence over expediency or shortcuts. IT believes every accident and every injury is preventable, and will take every reasonable step to reduce the possibility of injury, illness, or accident.

This site safety and health plan (SSHP) prescribes the procedures that must be followed during the activities at Carswell AFB. Operational changes which could affect the H&S of personnel, the community, or the environment will not be made without the prior approval of the IT project manager (PM) and the IT H&S manager.

The provisions of this plan are mandatory for all IT personnel and subcontractors assigned to the project. IT requires all visitors to the work site to abide by the requirements of the plan.

1.4 References

This SSHP complies with applicable OSHA and U.S. Environmental Protection Agency (EPA) regulations. This plan follows the guidelines established in the following:

- Standard Operating Safety Guidelines (EPA, December 1984)
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (National Institute of Occupational Safety and Health [NIOSH] 86-116)
- Title 29 of the Code of Federal Regulations (CFR), Part 1910.120, U.S. Department of Labor (DOL)/OSHA, Hazardous Waste and Emergency Response Operations
- Title 29 of the CFR, Part 1926.62, DOL/OSHA
- Title 29 of the CFR, Part 1926.62, DOL/OSHA, Hazardous Waste and Emergency Response Operations.

The contents of this plan are consistent with the IT H&S policies and procedures. IT Corporation (IT) will prepare this document and will perform the work in accordance with Delivery Order (DO) No. 003 issued by the United States Air Force Center for Environmental Excellence (AFCEE) under the Remedial Action Contract No. F412624-97-D-8024.

Section 2 Responsibilities

2.1 All Personnel

Each person is responsible for his safety and that of his coworkers, for completing tasks in a safe manner, and reporting any unsafe acts or conditions to his supervisor. All personnel are responsible for continuous adherence to these H&S procedures during the performance of their work. No person may work in a manner that conflicts with the safety and environmental precautions expressed in this SSHP. After due warnings, IT will dismiss from the site any person who violates safety procedures. IT's employees are subject to progressive discipline and may be terminated for blatant or continued violations. All on-site personnel will be trained in accordance with 29 CFR 1910.120, 29 CFR 1926.65, and this document.

2.2 Project Manager

The PM is ultimately responsible for ensuring that all project activities are completed in accordance with requirements set forth in this plan. The PM must perform at least one on-site safety review during the project. He is responsible for ensuring all accidents and incidents on the project are reported and thoroughly investigated. The PM must approve in writing any addenda or modifications of the SSHP.

2.3 Health & Safety Manager

The H&S manager for this project is responsible for developing and coordinating the SSHP and addenda as required. This plan complies with 29 CFR 1910.120 and 29 CFR 1926.65 in all respects and includes medical surveillance and training requirements, hazard assessment, personal protective equipment (PPE) specifications, field implementation procedures, and audits. The H&S manager is the contact for regulatory agencies on matters of safety and health. Other H&S manager responsibilities include:

- General H&S program administration
- Determining the level of personnel protection required
- Updating equipment or procedures based on information obtained during site operations
- Establishing air monitoring parameters based on expected contaminants
- Establishing employee exposure monitoring notification programs

- Investigating significant accidents and illnesses and implementing corrective action plans
- Performing regular site inspections
- Developing site-specific employee/community emergency response plans as required based on expected hazards.

2.4 Site Safety and Health Officer

The site safety and health officer (SSHO) has the ultimate responsibility to stop any operation that threatens the H&S of the team or surrounding populace, or that causes significant adverse impact to the environment. Other responsibilities include, but are not limited to:

- Implementing all safety procedures and operations on site
- Observing work crew members for symptoms of on-site exposure or stress
- Upgrading or downgrading, in coordination with the H&S manager and the PM, the levels of personal protection based upon site observations and monitoring results
- Informing the project H&S manager of significant changes in the site environment that require equipment or procedure changes
- Arranging for the availability of first aid and on-site emergency medical care, as necessary
- Determining evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation
- Ensuring that all site personnel and visitors have received the proper training and medical clearance prior to entering the site (refer to Section 6 of this plan)
- Establishing exclusion, contamination reduction, and support zones (refer to Section 7 of this plan)
- Presenting tailgate safety meetings and maintaining attendance logs and records
- Ensuring that the respiratory protection program is implemented (refer to Section 5 of this plan)
- Ensuring that decontamination procedures meet established criteria

- Ensuring that there is qualified first aid persons on site.

2.5 Subcontractors

On-site subcontractors and their personnel are responsible for understanding and complying with all site requirements. Subcontractors are required to read and acknowledge the subcontractor certification (Appendix A) and follow all of the provisions set forth in this SSHP.

2.6 On-Site Personnel and Visitors

All on-site personnel and visitors are required to comply with the provisions of this SSHP and all applicable federal, state, local, and DOD regulations. Each person is responsible for his/her own safety and health and for completing tasks in a safe manner. All on-site personnel will report any unsafe acts or conditions to his/her supervisor or the IT representative. Personnel will monitor themselves and their fellow employees for signs and symptoms of heat/cold stress and chemical exposure.

Section 3 Job Hazard Analysis

3.1 Scope of Work

The project involves capping various landfills, demolition and disposal of the former radar building installation and the excavation and disposal of excavate hot spots areas of phthlate contaminated soils. It is anticipated the following activities will take place in the completion of this project:

- Mobilization (set-up equipment)
- Excavation
- Restoration/backfill
- Confirmation sampling
- Landfill capping
- Building demolition
- Transformer removal
- Decontamination.

3.2 Activity Hazard Analysis By Task

The activity hazard analysis identifies potential safety, health, and environmental hazards and provides for the protection of personnel, the community and the environment. Because of the complexity and constant change of remediation projects, supervisors must continually inspect the work site to identify hazards that may harm site personnel, the community, or the environment. The PM, site supervisor, and SSHO must be aware of these changing conditions and discuss them with the H&SM. The H&SM will write addenda to modify job hazard analyses as necessary. Detailed activity hazard analyses by task are provided in Table 3-1.

3.3 Physical Hazards

The physical hazards are associated with heavy equipment, drilling, and vehicle use and movement, manual materials handling, and manual site preparation. Manual materials handling and manual site preparation may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. The work areas will present slip, trip, and fall hazards from scattered debris, wrecked building materials, and irregular walking surfaces. Wet weather may cause wet, muddy, slick walking surfaces and unstable soil at the excavation areas.

Operations at construction sites require good housekeeping.

Table 3-1

Activity Hazard Analysis
Former Carswell AFB, Texas

(Page 1 of 13)

Activity	Potential Hazards	Recommended Controls
Mobilizing Equipment	Slip, trip, and fall hazards	<ul style="list-style-type: none"> Determine best access route before transporting equipment. Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip, and fall hazards. Look before you step, ensure safe and secure footing.
	Heavy lifting	<ul style="list-style-type: none"> Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment.
	Hand tools	<ul style="list-style-type: none"> Tools shall be inspected prior to use. Defective tools shall be tagged and removed from service. Tools shall be used only for their intended purpose. Wear protective gloves (leather) when handling rough materials.
	Falling objects	<ul style="list-style-type: none"> Stay alert and clear of materials suspended overhead, wear hard hat and steel-toed boots.
	Pinch points	<ul style="list-style-type: none"> Keep hands, fingers, and feet clear of moving/suspended materials and equipment. Beware of contact points. Stay alert at all times!
	Bees, spiders, and snakes	<ul style="list-style-type: none"> Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Fire	<ul style="list-style-type: none"> Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Contact with moving equipment/vehicles	<ul style="list-style-type: none"> Work area will be barricaded/demarcated. Equipment will be laid out in an area free of traffic flow.
	Hazard communication	<ul style="list-style-type: none"> Label all containers as to contents and dispose of properly.
	Heat Rash	<ul style="list-style-type: none"> Keep the skin clean and dry. Change perspiration-soaked clothing, as necessary. Bathe at end of work shift or day. Apply powder to affected areas.

Table 3-1

Activity Hazard Analysis
Former Carswell AFB, Texas

(Page 2 of 13)

Activity	Potential Hazards	Recommended Controls
Mobilizing Equipment (continued)	Heat Cramps	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature) • Set up work/rest periods. • Use the buddy system. • Allow the workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat Stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices.
	Frost Nip Frost Bite Hypothermia	<ul style="list-style-type: none"> • Wear insulated clothing when temperatures drop below 40. • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.
	Lightning Strikes	<ul style="list-style-type: none"> • Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Keep 6 feet away from tree trunk if seeking shelter beneath tree(s). • If in a group, keep 6 feet of distance between people. • Minimize contact with the ground and keep body parts that must touch the ground as close together as possible.
	Thunderstorms, Tornadoes	<ul style="list-style-type: none"> • Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorm or tornado warnings, as directed by Field Supervisor. • Seek shelter. Do not try to outrun a tornado.

Activity Hazard Analysis
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Activity	Potential Hazards	Recommended Controls
Mobilizing Equipment (continued)	Dermatitis from Poisonous Plants	<ul style="list-style-type: none"> Post areas that have been identified as having poisonous plants. Avoid contact with these plants to the extent possible. Wear clothing or coveralls with long sleeves. Promptly wash clothing that has contacted poisonous plants. Apply ointment to affected area.
	Rabies/Bites from Snakes and Animals	<ul style="list-style-type: none"> Keep work area clear of vegetation and small bush. Avoid placing hands or feet into obscure areas. (i.e., beneath rocks, well pads, bush piles). Have a snakebite kit on site. Use the buddy system. Postpone work in areas where poisonous snakes or animals are nested.
	Ticks	<ul style="list-style-type: none"> Wear light colored clothing (can see ticks better). Mow vegetated and small brush areas. Wear insect repellent. Wear long sleeves and long pants. Visually check oneself promptly and frequently after exiting the work area.
	Stings from Bees, Wasps, Ants	<ul style="list-style-type: none"> Identify infested areas to the site supervisor. Workers who are allergic or capable of allergic reactions to bee, wasp, or ant stings or bites shall notify their supervisor(s). Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> Determine best access route before moving equipment. Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip, and fall hazards. Look before you step, ensure safe and secure footing.
Excavation of Soil and Backfill/Restoration	Cave-Ins	<ul style="list-style-type: none"> Entry into excavation/trench will be allowed only after consultation with the Field Supervisor. Excavations/trenches greater than 5 feet deep will not be entered unless sloped, stepped, or shored. Design of any support system will be reviewed and approved by a registered engineer. A competent person trained in soils identification will be present in the field. Nonessential equipment will be staged outside the immediate work area. Material used for piling, bracing, shoring, and underpinning will be in good serviceable condition. Foundations adjacent to where the excavation is to be made below foundation depth will be supported by shoring, bracing, or underpinning.
	Heavy lifting	<ul style="list-style-type: none"> Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment.
	Falling objects	<ul style="list-style-type: none"> Stay alert and clear of materials suspended overhead, wear hard hat and steel-toed boots.

Table 3-1

Activity Hazard Analysis
Former Carswell AFB, Texas

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Activity	Potential Hazards	Recommended Controls
Excavation of Soil and Backfill/Restoration (continued)	Pinch points	<ul style="list-style-type: none"> Keep hands, fingers, and feet clear of moving/suspended materials and equipment. Beware of contact points. Stay alert at all times!
	Bees, spiders, and snakes	<ul style="list-style-type: none"> Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Fire	<ul style="list-style-type: none"> Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Contact with Potentially Contaminated Materials	<ul style="list-style-type: none"> Personnel will wear proper protective clothing and equipment to safeguard against potential contamination. Only essential personnel will be in the work area. All personnel will follow good hygiene practices. Proper decontamination procedures will be followed. All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut Hazards	<ul style="list-style-type: none"> Wear adequate hand protection.
	Strains/Sprains	<ul style="list-style-type: none"> Use the proper tool for the job being performed. Get assistance if needed. Avoid twisting/turning while pulling on tools, moving equipment, etc.
	Unattended Worker	<ul style="list-style-type: none"> "Buddy System" - visual contact will be maintained with other personnel during excavation activities.
	Traffic Vehicle Accidents	<ul style="list-style-type: none"> Place physical barrier (i.e., barricades, fencing) around work areas regularly occupied by pedestrians. If working adjacent to roadways, have workers wear fluorescent orange vests. Use warning signs or lights to alerts oncoming traffic. Assign flag person(s) if necessary to direct local traffic. Set up temporary parking locations outside the immediate work area. Motor vehicle operators will obey all posted traffic signs, signals, and speed limits. Pedestrians have the right-of-way. Wear seat belts when vehicles are in motion.
	Cuts, Bruises	<ul style="list-style-type: none"> Use cotton or leather work gloves for materials handling.

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**Activity Hazard Analysis
Former Carswell AFB, Texas**

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Activity	Potential Hazards	Recommended Controls
Excavation of Soil and Backfill/Restoration (continued)	Noise	<ul style="list-style-type: none"> • Conduct noise surveys on activities in question. • Provide hearing protection on site. • Required use of hearing protection when noise levels are at or exceed 85 dB(A). • Use engineering controls (i.e., guards, mufflers, distance) to reduce worker exposure. • Supervisors will inform employees of high noise areas where hearing protection is required and demarcate them.
	Buried Utilities	<ul style="list-style-type: none"> • Before beginning intrusive activities, the Field Supervisor will ensure that underground utilities (i.e., electrical, phone, gas, water lines) are located. • Review blueprints and as-built drawings of facility layout. • When underground utilities are exposed, they will be protected to avoid damage. • All uncovered lines will be identified before work proceeds. • Personnel on the ground will assist in probing the soils to find the exact location of the liens and will use wooden handled shovels to carefully remove the soil adjacent to the lines. • Identify work area to be cleared. • Look at underground utility drawings. • Contact owner of work area. • Receive approval for excavation/trenching or relocate activities. • Complete excavation permit. • Review expiration date of excavation permit.
	Heavy Equipment and Machinery Operation	<ul style="list-style-type: none"> • Only authorized personnel will operate heavy equipment. • Use qualified and trained equipment operators. • Mobile heavy equipment must have properly functioning back-up alarms. • Spotters on the ground will assist operators in manipulating vehicles and equipment into tight or confined spaces. • Operators will maintain a constant awareness of personnel and equipment in the work areas. • Machinery or equipment will not run unattended. • Blade, bucket, etc., will be fully lowered or blocked when not in use or being repaired. • Rollover protection will be used when conditions call for such use. • No overhead work will be performed when, as a result of that work, the possibility of a falling object striking any person exists. • Cranes, derricks, drill rigs, booms or similar equipment will have a minimum 20 feet clearance from overhead electrical power lines. • Loads will never be carried over personnel. • When any machinery or equipment is found to be unsafe as a deficiency is noted, the equipment will immediately be taken out of service and its use prohibited until unsafe conditions have been corrected. • Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.

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Activity	Potential Hazards	Recommended Controls
Excavation of Soil and Backfill/ Restoration (continued)	Heavy Equipment and Machinery Operation (continued)	<ul style="list-style-type: none"> • Getting off or on any equipment while it is in motion is prohibited. • Seats should be provided for each occupant of the equipment. • Equipment operation on the highway will be equipped with headlights, taillights, brake lights, back-up lights, and turn signals visible from the front and rear. • All mobile equipment and the areas in which they are operated will be adequately illuminated. • Mechanized equipment will be shut down prior to and during fueling operations. • Whenever equipment is parked, the parking brake will be set. • The rated capacity on lift trucks and cranes will be posted on the vehicle so as to be clearly visible. • The load capacity ratings will not be exceeded at any time. • No guard, safety appliance, or device will be tampered with. • Heavy equipment operator will inform their Supervisor(s) of any prescribed medication that they are taking that would impair their judgement. • When conditions are such that lightning is occurring, all equipment operations will cease. • Personnel are not allowed to work off of machinery or to use them as ladders. • Never walk or work directly in back of or to the side of heavy equipment without the operator's knowledge. • Heavy equipment will be equipped with a fire extinguisher. • Site workers will establish hand signals when verbal communication becomes difficult. • Leave machinery in low gear on steep grades. • The operator will ensure that the equipment is on solid ground or foundation with outriggers extended before starting. • Before coupling support equipment (i.e., sheepsfoot roller, air compressor) to other equipment, the machine will be stopped, the transmission placed in neutral, and the brakes set before
Decontamination	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. • Lifts greater than 60 pounds require assistance or mechanical equipment • Sizeup the lift.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Good housekeeping shall be implemented. • The work area shall be kept clean as feasible. • Inspect the work area for slip, trip, and fall hazards.
	Fueling	<ul style="list-style-type: none"> • Only approved safety cans shall be used to store fuel. • Do not refuel equipment while it is operating. • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.

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**Activity Hazard Analysis
Former Carswell AFB, Texas**

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Activity	Potential Hazards	Recommended Controls
Decontamination (continued)	Faulty or damaged equipment	<ul style="list-style-type: none"> • Equipment shall be inspected before being placed into service and at the beginning of each shift. • Preventive maintenance procedures recommended by the manufacturer shall be followed. • A lockout/tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
	High-pressure water	<ul style="list-style-type: none"> • Jetting gun operator must wear appropriate PPE including hard hat, impact-resistant safety glasses with side shields, water-resistant clothing, metatarsal guards for feet and legs, and hearing protection (if appropriate). • One standby person shall be available within the vicinity of the pump during jetting operation. • The work area shall be isolated and adequate barriers will be used to warn other site personnel.
	Unqualified operators	<ul style="list-style-type: none"> • Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Out of control equipment	<ul style="list-style-type: none"> • No machinery or equipment is permitted to run unattended. • Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 dBA mandates hearing protection by nearby site personnel.
	Activation during repairs	<ul style="list-style-type: none"> • All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	<ul style="list-style-type: none"> • Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert and clear of materials suspended
	Falling objects	<ul style="list-style-type: none"> • Hard hats are required by site personnel. • Stay alert and clear of material suspended overhead.
	Flying debris	<ul style="list-style-type: none"> • Impact-resistant safety glasses with side shields are required.
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> • All site personnel will wear the appropriate PPE.
	Pinch points	<ul style="list-style-type: none"> • Keep guards in place. • Keep hands and feet clear of moving/suspended materials and equipment. • Wear hard toe/shank safety shoes/boots.

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**Activity Hazard Analysis
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Activity	Potential Hazards	Recommended Controls
Building Demolition	Heavy Equipment and Machinery Operation	<ul style="list-style-type: none"> Heavy equipment operator will inform their Supervisor(s) of any prescribed medication that they are taking that would impair their judgement. When conditions are such that lightning is occurring, all equipment operations will cease. Personnel are not allowed to work off of machinery or to use them as ladders. Never walk or work directly in back of or to the side of heavy equipment without the operator's knowledge. Heavy equipment will be equipped with a fire extinguisher. Site workers will establish hand signals when verbal communication becomes difficult. Leave machinery in low gear on steep grades. The operator will ensure that the equipment is on solid ground or foundation with outriggers extended before starting. Before coupling support equipment (i.e., sheepfoot roller, air compressor) to other equipment, the machine will be stopped, the transmission placed in neutral, and the brakes set before
	Unqualified operators	<ul style="list-style-type: none"> Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Out of control equipment	<ul style="list-style-type: none"> No machinery or equipment is permitted to run unattended. Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	<ul style="list-style-type: none"> Sound levels above 85 dBA mandates hearing protection by nearby site personnel.
	Activation during repairs	<ul style="list-style-type: none"> All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	<ul style="list-style-type: none"> Keep feet and hands clear of moving/suspended materials and equipment. Stay alert and clear of materials suspended
	Falling objects	<ul style="list-style-type: none"> Hard hats are required by site personnel. Stay alert and clear of material suspended overhead.
	Flying debris	<ul style="list-style-type: none"> Impact-resistant safety glasses with side shields are required.
	Pinch points	<ul style="list-style-type: none"> Keep guards in place. Keep hands and feet clear of moving/suspended materials and equipment. Wear hard toe/shank safety shoes/boots.
	Heavy lifting	<ul style="list-style-type: none"> Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment Sizeup the lift.

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**Activity Hazard Analysis
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Activity	Potential Hazards	Recommended Controls
Building Demolition (continued)	Cut Hazards	<ul style="list-style-type: none"> • Wear adequate hand protection.
	Strains/Sprains	<ul style="list-style-type: none"> • Use the proper tool for the job being performed. • Get assistance if needed. • Avoid twisting/turning while pulling on tools, moving equipment, etc.
	Flammable liquid storage	<ul style="list-style-type: none"> • Storage of gasoline and diesel fuels shall only be stored in approved containers. • No hot work, welding, or smoking shall be allowed within 50 feet of flammable and combustible liquid storage areas. • Flammable storage areas shall be provided with a minimum 20 lb ABC dry chemical fire extinguisher. • Flammable liquid storage areas shall not be within 20 feet of any building.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Good housekeeping shall be implemented. • The work area shall be kept clean as feasible. • Inspect the work area for slip, trip, and fall hazards.
Confirmation Sampling	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> • Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Only essential personnel will be in the work area • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut hazards	<ul style="list-style-type: none"> • Use care when handling glassware. • Wear adequate hand protection.
	Hazard communication	<ul style="list-style-type: none"> • Label all containers as to contents.
	Strains/sprains	<ul style="list-style-type: none"> • Use the proper tool for the job being performed. • Get assistance if needed. • Avoid twisting/turning while pulling on tools, moving equipment, etc.
	Spills/residual materials	<ul style="list-style-type: none"> • Absorbent material and containers will be kept available where leaks or spills may occur.
	Lighting	<ul style="list-style-type: none"> • Adequate lighting will be provided to ensure a safe working environment.
	Unattended worker	<ul style="list-style-type: none"> • "Buddy System" - visual contact will be maintained with the sampling technician during sampling activities.

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**Activity Hazard Analysis
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Activity	Potential Hazards	Recommended Controls
Confirmation Sampling (continued)	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Good housekeeping shall be implemented. • The work area shall be kept clean as feasible. • Inspect the work area for slip, trip, and fall hazards.
	Faulty or damaged equipment being utilized to perform work	<ul style="list-style-type: none"> • All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition. • Equipment will be inspected before being put to use and at the beginning of each shift. • Faulty/unsafe equipment will be tagged and if possible locked out.
Transformer Removal	Heavy Equipment and Machinery Operation	<ul style="list-style-type: none"> • Heavy equipment operator will inform their Supervisor(s) of any prescribed medication that they are taking that would impair their judgement. • When conditions are such that lightning is occurring, all equipment operations will cease. • Personnel are not allowed to work off of machinery or to use them as ladders. • Never walk or work directly in back of or to the side of heavy equipment without the operator's knowledge. • Heavy equipment will be equipped with a fire extinguisher. • Site workers will establish hand signals when verbal communication becomes difficult. • Leave machinery in low gear on steep grades. • The operator will ensure that the equipment is on solid ground or foundation with outriggers extended before starting. • Before coupling support equipment (i.e., sheepsfoot roller, air compressor) to other equipment, the machine will be stopped, the transmission placed in neutral, and the brakes set before
	Unqualified operators	<ul style="list-style-type: none"> • Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Activation during removal	<ul style="list-style-type: none"> • All power to the transformer must be disconnected by a certified electrician.
	Bees, spiders, and snakes	<ul style="list-style-type: none"> • Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Fire	<ul style="list-style-type: none"> • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Contact with Potentially Contaminated Materials while draining the liquids from the transformer	<ul style="list-style-type: none"> • Personnel will wear proper protective clothing and equipment to safeguard against potential contamination. • Only essential personnel will be in the work area. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.

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Activity	Potential Hazards	Recommended Controls
Transformer Removal (continued)	Cut Hazards	<ul style="list-style-type: none"> Wear adequate hand protection.
	Strains/Sprains	<ul style="list-style-type: none"> Use the proper tool for the job being performed. Get assistance if needed. Avoid twisting/turning while pulling on tools, moving equipment, etc.
	Pinch points	<ul style="list-style-type: none"> Keep feet and hands clear of moving/suspended materials and equipment. Stay alert at all times!
	Fire	<ul style="list-style-type: none"> Mechanized equipment shall be shut down prior to and during fueling operations. Have fire extinguishers inspected and readily available.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> Good housekeeping shall be implemented. The work area shall be kept clean as feasible. Inspect the work area for slip, trip, and fall hazards.
Landfill Cap construction	Contact with Potentially Contaminated Materials w	<ul style="list-style-type: none"> Personnel will wear proper protective clothing and equipment to safeguard against potential contamination. Only essential personnel will be in the work area. All personnel will follow good hygiene practices. Proper decontamination procedures will be followed. All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Hazard communication	<ul style="list-style-type: none"> Label all containers as to contents and dispose of properly.
	Heat Rash	<ul style="list-style-type: none"> Keep the skin clean and dry. Change perspiration-soaked clothing, as necessary. Bathe at end of work shift or day. Apply powder to affected areas.
	Heat Cramps	<ul style="list-style-type: none"> Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature) Set up work/rest periods. Use the buddy system. Allow the workers time to acclimate. Have ice packs available for use. Take frequent breaks.

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Activity	Potential Hazards	Recommended Controls
Landfill Cap construction (continued)	Heat Stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices.
	Frost Nip Frost Bite Hypothermia	<ul style="list-style-type: none"> • Wear insulated clothing when temperatures drop below 40. • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.
	Lightning Strikes	<ul style="list-style-type: none"> • Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Keep 6 feet away from tree trunk if seeking shelter beneath tree(s). • If in a group, keep 6 feet of distance between people. • Minimize contact with the ground and keep body parts that must touch the ground as close together as possible.
	Thunderstorms, Tornadoes	<ul style="list-style-type: none"> • Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorm or tornado warnings, as directed by Field Supervisor. • Seek shelter. Do not try to outrun a tornado.
	Dermatitis from Poisonous Plants	<ul style="list-style-type: none"> • Post areas that have been identified as having poisonous plants. • Avoid contact with these plants to the extent possible. • Wear clothing or coveralls with long sleeves. • Promptly wash clothing that has contacted poisonous plants. • Apply ointment to affected area.
	Rabies/Bites from Snakes and Animals	<ul style="list-style-type: none"> • Keep work area clear of vegetation and small bush. • Avoid placing hands or feet into obscure areas. (i.e., beneath rocks, well pads, bush piles). • Have a snakebite kit on site. • Use the buddy system. • Postpone work in areas where poisonous snakes or animals are nested.

Table 3-1

**Activity Hazard Analysis
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Activity	Potential Hazards	Recommended Controls
Landfill Cap construction (continued)	Ticks	<ul style="list-style-type: none"> • Wear light colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellent. • Wear long sleeves and long pants. • Visually check oneself promptly and frequently after exiting the work area.
	Stings from Bees, Wasps, Ants	<ul style="list-style-type: none"> • Identify infested areas to the site supervisor. • Workers who are allergic or capable of allergic reactions to bee, wasp, or ant stings or bites shall notify their supervisor(s). • Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms. • Wear adequate hand protection.
	Cut Hazards	
	Strains/Sprains	<ul style="list-style-type: none"> • Use the proper tool for the job being performed. • Get assistance if needed. • Avoid twisting/turning while pulling on tools, moving equipment, etc.
	Heavy Equipment and Machinery Operation	<ul style="list-style-type: none"> • Heavy equipment operator will inform their Supervisor(s) of any prescribed medication that they are taking that would impair their judgement. • When conditions are such that lightning is occurring, all equipment operations will cease. • Personnel are not allowed to work off of machinery or to use them as ladders. • Never walk or work directly in back of or to the side of heavy equipment without the operator's knowledge. • Heavy equipment will be equipped with a fire extinguisher. • Site workers will establish hand signals when verbal communication becomes difficult. • Leave machinery in low gear on steep grades. • The operator will ensure that the equipment is on solid ground or foundation with outriggers extended before starting. • Before coupling support equipment (i.e., sheepfoot roller, air compressor) to other equipment, the machine will be stopped, the transmission placed in neutral, and the brakes set before
	Unqualified operators	<ul style="list-style-type: none"> • Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Fires	<ul style="list-style-type: none"> • Eliminate sources of ignition from the work area • Prohibit smoking • Mechanized equipment shall be shut down prior to and during fueling operations. • Have fire extinguishers inspected and readily available.

3.3.1 Excavation Hazards

The presence of overhead utilities such as power lines requires careful positioning of the excavating equipment in order to maintain a safe distance between the lines and the closest part of the equipment. The presence of underground utilities such as gas lines, power lines, water lines, and sewer pipes must be determined prior to beginning the excavation.

Excavations pose significant hazards to employees if they are not carefully controlled. There exists a chance for the excavation to collapse in on itself if it is not dug properly, sloped, benched, or shored as required. The excavation is also a fall hazard and employees must pay careful attention to what they are doing or they risk a fall into the excavation.

3.3.2 General Ladder Safety

Safe use of ladders involves selecting the right ladder for the job, properly setting up the ladder, and climbing it properly.

Ladder Types. Wooden or fiberglass ladders should be used for electrical work or work in proximity to electrical lines or circuits.

A ladder's type indicates the weight it can support. Include the weight of tools or equipment when determining the proper type.

- Type 1A - Extra heavy industrial ladder - 300 lbs.
- Type 1 - Heavy duty industrial ladder - 250 lbs.
- Type 2 - Medium duty commercial ladder - 225 lbs.
- Type 3 - Light duty household ladder - 200 lbs.

Stepladders may be used provided the ladder is fully opened, the spreaders are locked, and the user does not ascend to or stand on the top two rungs.

Extension ladders must have stops installed to ensure sufficient overlap of the two sections. The amount of the overlap is dependent on the total length of the ladder.

- Up to 32 feet in length - 3 foot overlap
- 32 to 36 feet in length - 4 foot overlap
- 36 to 48 feet in length - 5 foot overlap
- Over 48 feet in length - 6 foot overlap.

Two people should raise and lower an extension ladder, which must not be raised and lowered in an extended position. The foot of the ladder must be secured before extending it.

Ladder Set-Up. The set-up angle of the ladder is very important. The distance between the foot of the ladder and the base of the object it is leaning against must be approximately one-fourth of the distance between the bottom and top supports. The ladder should be set up so that approximately three feet extends above the highest surface. The ladder must stand on a firm, level surface, away from pedestrian and vehicle traffic. If the ladder must be located in such an area, barricades must be located to prevent pedestrians or vehicles from passing close to the ladder. Ladders must never be set up on an unstable base, or set up on an object to obtain more height.

Ladders will be ascended and descended facing the ladder, using both hands. Tools, supplies, and equipment will be raised and lowered by rope, not carried while traversing the ladder.

The ladder should be tied off at chest height for stability. Long ladders should be tied off at the top as well.

If you must stretch to reach your work, climb down and relocate the ladder.

3.3.3 Decontamination of Vehicles and Equipment

A temporary control zone will be established. This control zone will support haulage trucks while they are being loaded. This control zone will be constructed by laying down heavy plastic sheeting (thick enough to withstand truck traffic) weighted down on the sides by sand bags.

Once each truck is loaded, the sides of the truck box and tailgate area will be swept clean while still in the control zone. Any dirt or clay accumulation on the truck tires from the excavation site will be rinsed off using a pressurized sprayer. Water collected in the control zone will be distributed over the soil to be transported for disposal.

3.3.4 Drum Handling Hazards

Accidents may occur during handling of drums and other hazardous waste containers. Hazards include physical injury resulting from moving heavy containers by hand and working around drums and heavy equipment.

3.4 Chemical Hazards

Previous soil sampling results from the hot spot area located approximately 1,000 feet southwest of the former radar building revealed the greatest concentration Bis(2-ethylhexyl)phthalate. The soils under the concrete pad, for the transformer, will be sampled for the presence of PCBs and the former radar building will be assessed to determine the presence and extent of lead based paints, PCBs and asbestos.

If the radar building assessment determines that asbestos and lead are present, then licensed contractors will be used to permit removal of the lead and asbestos-containing materials. The contractor(s) will develop and submit a safety and health plan for these activities and this plan will be added as an attachment to this document.

During excavation and demolition activities, the exposure potential for organic compounds is likely, therefore, workers should be familiar with the health effects described in Table 3-2. Table 3-2 also provides hazard information for contaminants which, may be encountered during the remedial activities.

All IT personnel must strictly adhere to the appropriate safety procedures. The potential hazards and the appropriate controls will be presented to project personnel at the site-specific orientation and during daily tailgate safety meetings.

3.5 Exposure Standards

Currently, permissible exposure limits (PEL) to chemical substances are regulated by OSHA. Most PELs are based upon the time-weighted average (TWA) concentration for a normal 8-hour work day and a 40-hour work week.

Threshold limit values (TLV) and Recommended Exposure Limits (REL) refer to airborne concentrations of substances that represent conditions to which nearly all employees may be repeatedly exposed to day after day without adverse effect. These TLVs are prescribed by the American Conference of Governmental Industrial Hygienists (ACGIH), whereas, RELs are recommended by the NIOSH are based on the best available information obtained through industrial experience and animal or human studies. Because of the wide variation in individual susceptibility, a small percentage of workers may experience discomfort from some substances at concentrations below the recommended values. It has been policy to use these guidelines for good hygienic practices; however, whenever applicable, stricter guidelines may be utilized.

Several chemical substances have short-term exposure limits or ceiling values that allow a maximum concentration to which workers can be exposed continuously for a short period of time without suffering from:

- Irritation
- Chronic or irreversible tissue damage
- Narcosis of a sufficient degree to result in accidental injury, impaired self-rescue abilities, or substantially reduced work efficiency.

The short-term exposure limit is defined by the ACGIH and OSHA as a 15-minute TWA exposure, which should not be exceeded within a 2-hour time period during a workday even if the 8-hour TWA is within applicable limits. OSHA requires that a 15-minute "ceiling"

Table 3-2

Chemical Exposure And Hazard Information Carswell AFB, Texas

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Substance [CAS]	IP ^a (cV)	Physical Description, Odor Type & Threshold (ppm)	Route ^b	Symptoms of Exposure	Treatment ^c	TWA ^d	STEL ^d	Source ^e	IDLH (NIOSH) ^f
Alconox [NA]	NA	NA	Inh Ing	Inhalation of powder may cause local irritation to mucous membranes, ingestion may cause discomfort and diarrhea.	Eye: Irrigate immediately Breath: Fresh air Swallow: Seek medical attention	NA	NA	NA	NA
Asbestos Hydrated Mineral Silicates [2212-31 (Blue)] [2590-31 (white)]	NA	White or greenish (chrysotile, blue (crocidolite), or gray-green (amosite) fibrous odorless solid	Inh Ing Con	Irritation of the eyes, difficulty breathing, interstitial fibrosis, finger clubbing and asbestosis. Carcinogen	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	Lowest possible exposure 0.1 fiber per 29 CFR 1910.1001)	NA NA	PEL TLV	ND
bis(2-Ethylhexyl)phthalate [117-81-7]	NA	Colorless liquid	Inh Abs Ing Con	Irritates mucus membranes.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	5.0 mg/m ³ 5.0 mg/m ³	NA NA	PEL TLV	Ca 5 mg/m ³
Diesel fuel [NA]	NA	oily liquid with hydrocarbon odor NA	Inh Ing Con	Ingestion causes nausea, vomiting, and cramps; CNS depression, headache, coma, death. Inhalation causes pulmonary irritation, lightheadedness. Aspiration causes severe lung irritation, coughing pulmonary edema. Irritant to skin and mucous membranes.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention Aspirate: Immediate medical attention	NA 100 mg/m ³ (skin) (NIC)	NA NA	PEL TLV	ND
Diesel engine emissions (diesel exhaust - NO _x , CO, carcinogenic compounds)	NA	varies upon exhaust component	Inh Con	Eye irritation; pulmonary function changes; carcinogen.	Breath: Respiratory support	NA 0.15 mg/m ³ (NIC)	NA NA	PEL TLV	CA [ND]
[NA] Gasoline [8006-61-9]	NA	NA clear liquid with gasoline odor 0.3	Inh Ing Con Abs	Intoxication, headaches, blurred vision, dizziness, nausea; eye, nose, and throat irritation. Carcinogenic (benzene).	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	NA 300 ppm	NA 500 ppm	PEL TLV	Ca [ND]

Refer to footnotes at end of table.

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Table 3-2

Chemical Exposure And Hazard Information

Carswell AFB, Texas

(Page 2 of 3)

Substance [CAS]	IP ^a (eV)	Physical Description, Odor Type & Threshold (ppm)	Route ^b	Symptoms of Exposure	Treatment	TWA ^c	STEL ^d	Source ^e	IDLH (NIOSH) ^f
Hydraulic oil [NA]	NA	oily liquid with hydrocarbon odor	Ing Con	Dermatitis	Eye: Skin: Breath: Swallow: Irrigate immediately Soap wash promptly Fresh air Immediate medical attention	NA	NA	NA	ND
Lead Inorganic dusts & fumes (as Pb) [7439-92-1]	NA	Gray odorless solid	Inh Ing Con	Weakness, lassitude, insomnia; facial pallor; eye pallor, low body weight, malnutrition; consti- pation, abdominal pain, colic; anemia; gingival lead line; tremors; wrist and ankle paralysis; brain damage; kidney damage; irritated eyes; hypertension.	Eye: Skin: Breath: Swallow: Irrigate immediately Soap flush promptly Respiratory support Immediate medical attention	0.05 mg/m ³ 0.05 mg/m ³ (NIC) (CA - See 29 CFR 1910.1025)	NA NA	PEL TLV	100 mg/m ³ (as Pb)
Polychlorinated biphenyls (PCBs) Aroclor 1242 (chlorodiphenyl 42% Cl) [53469-21-9] Aroclor 1254 (chlorodiphenyl 54% Cl) [11097-69-1]	NA	oily liquid with hydrocarbon odor NA	Inh Ing Abs Con	Aroclor 1242: mildly toxic by ingestion. Poison by subcutaneous route. Aroclor 1254: poison by intravenous route. Moderately toxic by ingestion and intrapertitoneal routes. Both irritate eyes; chloracne. Carcinogenic and reproductive effects.	Eye: Skin: Breath: Swallow: Irrigate immediately Soap wash immediately Respiratory support Immediate medical attention	Aroclor 1242: 1 mg/m ³ (skin) 1 mg/m ³ (skin) Aroclor 1254: 0.5 mg/m ³ (skin) 0.5 mg/m ³ (skin)	NA NA NA NA	PEL TLV PEL TLV	Ca [5 mg/m ³] Ca [5 mg/m ³]

^aIP = Ionization potential (electron volts).^bRoute: Inh = Inhalation; Abs = Skin absorption; Ing = Ingestion; Con = Skin and/or eye contact.^cTWA = Time-weighted average. The TWA concentration for a normal work day (usually 8 or 10 hours) and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day without adverse effect.^dSTEL = Short-term exposure limit. A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the TWA is not exceeded.^eSource: PEL = Permissible Exposure Limit (OSHA - 29 CFR 1910.1000, Table Z); TLV = Threshold Limit Value (ACGIH); NIOSH = National Institute for Occupational Safety and Health; WEEL = Workplace Environmental Exposure Level (AIHA).^fIDLH (NIOSH) = Immediately dangerous to life or health (NIOSH). Represents the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.

Refer to footnotes at end of table.

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Table 3-2

Chemical Exposure And Hazard Information **Carswell AFB, Texas**

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ppm = Parts per million
 mg/m³ = Milligrams per cubic meter
 skin = Danger of cutaneous absorption
 ND = No evidence could be found for the existence of an IDLH (National Institute for Occupational Safety and Health Pocket Guide to Chemical Hazards, Pub. No. 94-116, June 1994)
 C = Ceiling limit value which should not be exceeded at any time.
 Ca = Carcinogen.
 NA = Not applicable or not available.
 LEL = Lower explosive limits.
 LC₅₀ = Lethal concentration in air for 50 percent of population tested.
 LD₅₀ = Lethal dose for 50 percent of population tested.
 NIC = Notice of intended change (ACGIH).

References:

Guide to Occupational Exposure Values - 1997, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
 Lewis, Richard J., Sr., 1992, Sax's Dangerous Properties of Industrial Materials, 8th ed., Van Nostrand Reinhold, New York.
 Micromedex Toxmes Plus (R) System, 1995, Micromedex, Inc.
 Pocket Guide to Chemical Hazards, Pub. No. 97-140, June 1997, National Institute for Occupational Safety and Health (NIOSH).
 Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association (AIHA), 1989.
 Workplace Environmental Exposure Levels, American Industrial Hygiene Association (AIHA), 1995.

Refer to footnotes at end of table.

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concentration never be exceeded for that chemical constituent. This notation appears as the letter "C" after the chemical name.

Under certain chemical substance listings, a "skin" notation may appear. This refers to the potential contribution to the overall exposure by the cutaneous route, including mucous membranes and eye, either airborne or by direct contact. Little quantitative data is available describing absorption as a function of the concentration to which the skin is exposed. Biological monitoring may be considered to determine the relative contribution of dermal exposure to the total dose.

The ACGIH, NIOSH, and OSHA have recognized through epidemiological studies, toxicology studies and, to a lesser extent, case histories that certain chemical substances may have the potential to be carcinogenic in humans. Because of the long latency period for many carcinogens, it is often impossible to base timely risk management decisions on the results of such information. Two categories of carcinogens (confirmed human carcinogens and suspected human carcinogens) are designated, based on the most current literature and information. These categories are based on either:

- Limited epidemiologic evidence
- Demonstration of carcinogens in one or more animal species by appropriate methods.

The worker potentially exposed to a known human carcinogen must be properly equipped to ensure virtually no contact with the chemical constituents. In the case of a suspected human carcinogen, worker exposure by all routes must be carefully controlled by the use of personal and respiratory protection and through administrative or engineering controls.

The exposure guidelines currently established by ACGIH, NIOSH, and OSHA are provided in Table 3-2. It is IT policy that the stricter guideline shall apply.

3.6 Noise

Noise exposure at or above the OSHA action level (85 decibels [dBA]) is anticipated during the activities under the intended scope of work. Noise sources would include heavy equipment, demolition activities and high pressure water decontamination operations.

Workers should be aware that exposure to noise over the OSHA action level of 85 dBA can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on site.

3.7 Anticipated Biological Hazards

3.7.1 Snakes

Workers at Carswell AFB have potential to encounter poisonous snakes such as water moccasins, rattlesnakes, and copperheads. All personnel shall be cautioned to be alert to the presence of snakes. If a snake bite occurs, attempts should be made to kill the snake for positive identification. The victim should be transported to the nearest hospital within 30 minutes (refer to Appendix E, Figure 1-1). First aid consists of applying a pressure bandage; omit cutting and sucking (unless medical care cannot be obtained within 30 minutes). Snake venoms are complex and include proteins, some of which have enzymatic activity. The effects produced by venoms include neurotoxic effects with sensory, motor, cardiac, and respiratory difficulties; cytotoxic effects on red blood cells, blood vessels, heart muscle, kidneys, and lungs; defects in coagulation; and effects from local release of substances by enzymatic actions. Other noticeable effects of snake bites include swelling, edema and pain around the bite, and the development of ecchymosis (the escape of blood into tissues from ruptured blood vessels).

3.7.2 Insects

All IT personnel and subcontractors should be aware of the presence of fire ants throughout the base. Precautionary methods include familiarizing the locations of fire ant mounds and minimizing contact of body parts with the ground near fire ant mounds.

All IT personnel and subcontractors should be aware of the potential presence of deer ticks in wooded areas during the months of April through October. Precautionary methods include familiarity with the signs/symptoms and potential health hazards of Lyme disease, and the proper implementation of appropriate work practices.

During the months of April through October, particular caution must be exercised to prevent being bitten by ticks and potentially contracting Lyme disease, Rocky Mountain Fever, and other tick-borne diseases. Specific precautions include:

- Wear hooded coveralls to cover your body as much as possible. Light color clothing makes spotting of ticks easier.
- Try to eliminate possible paths by which the deer tick may reach unprotected skin. For example, tuck bottoms of pants into socks or boots and sleeves into gloves. (Duct tape may be utilized to help seal cuffs and ankles.) If heavy concentrations of ticks or insects are anticipated or encountered, Tyvek coveralls may be utilized.
- Conduct periodic and frequent (e.g., hourly) surveys of your clothing for the presence of ticks. Remove any ticks/insects that become attached to clothing.

- Use insect/tick repellents. Apply repellents in accordance with manufacturers' recommendations. These repellents are readily available and include such brands as Deep Woods OFF and Maximum Strength OFF. Check the ingredients of the repellent. IT field personnel should check with the PM to ensure use of insect repellents will not interfere with sample collection procedures.

3.7.3 Buried Sharp Objects

The Landfill contains numerous sharp objects such as broken glass and rusted metal fragments. Site personnel should be aware of potential bacterial/viral infections (e.g., tetanus) through ingestion following skin contact, or from puncture wounds sustained from stepping on or handling buried sharp objects. Potential contact with objects that could cause cuts or puncture wounds to the skin may also create hazards associated with blood-borne pathogens from medical waste. (See Section 12)

3.7.4 Poisonous Plants

If work sites are located in areas where poisonous plants such as poison ivy, poison sumac, and poison oak may be encountered, personnel should wear long pants, long sleeves, and gloves to minimize the possibility of exposure. In some areas, the use of a Tyvek or other protective suit may be advisable.

Section 4 Safety Program and Procedures

The following work practices will be observed during all site activities.

4.1 General Practices

- At least one copy of this plan shall be available at the project site, in a location readily available to all personnel, including visitors.
- As practical, personnel should practice contamination avoidance. All solid and liquid samples should be collected in such a manner as to minimize contact with the material.
- Contaminated protective equipment, such as respirators, hoses, boots, etc., shall not be removed from the area of potential contamination until it has been cleaned or properly packaged and labeled.
- Legible and understandable precautionary labels that comply with the hazard communication standard shall be affixed prominently to all containers of contaminated scrap, waste, debris, and clothing.
- Removal of contaminated solids from protective clothing or equipment by blowing, shaking, or any other means that disperse contaminants into the air is prohibited.
- No food or beverages shall be present or consumed in the regulated area.
- No tobacco products shall be present or used in the regulated area.
- Cosmetics shall not be applied within the regulated area.
- Contaminated materials shall be stored in tightly closed containers, in well-ventilated areas.
- Emergency equipment shall be located outside storage areas in readily accessible locations that will remain minimally contaminated in an emergency.
- All areas that have been determined as uncontaminated inside the regulated area will be clearly marked as such. No unauthorized personnel shall be in these areas until they have been decontaminated.
- Ensure that no one is required to lift more than 60 pounds.

- All crew personnel on site shall use the buddy system (working in pairs or teams). If protective equipment or noise levels impair communications, then prearranged hand signals shall be used for communication. Visual contact shall be maintained between crew members at all times, and crew members must observe each other for signs of toxic exposure. Indication of adverse effects include, but are not limited to:
 - Changes in complexion and skin coloration
 - Changes in coordination
 - Changes in demeanor
 - Excessive salivation and pupillary response
 - Changes in speech pattern.
- Employees shall inform their partners or fellow team members of nonvisible effects of overexposure to toxic materials. The symptoms of such overexposure may include:
 - Headaches
 - Dizziness
 - Nausea
 - Blurred vision
 - Cramps
 - Irritation of eyes, skin, or respiratory tract.
- Visitors to the site shall abide by the following:
 - "Visitor" means persons not involved in routine site work activities.
 - All visitors shall be instructed to stay outside the exclusion zone (EZ) and contamination reduction zone (CRZ) and remain within the support zone during the extent of their stay. Visitors shall be cautioned to avoid skin contact with contaminated or potentially contaminated surfaces.
 - Visitors requesting to observe work conducted in the EZ must wear all appropriate personal protective equipment (PPE) prior to entry into that zone. If respiratory protective devices are necessary, visitors who wish to enter the EZ must produce evidence that they have had a complete physical examination, respirator training, and have been fit tested for the respirator to be used within the past 12 months.

4.2 Operating Procedures

Confined-Space Entry. Confined-space entry will not be performed during excavation or confirmation sampling activities. If confined-space entry must be performed, a SSHP addenda shall be prepared and approved prior to work start.

4.2.1 Heavy Equipment Operating Safety

The physical hazards and control methods shown in Table 3-1 shall be reviewed for each task and communicated to all affected personnel. As new hazards are discovered, the hazards will be promptly communicated to site personnel. Prior to the start of site work, the heavy equipment operators will inspect all equipment in the presence of the site supervisor.

All heavy equipment will be used in the manner it was intended. Drivers will operate all equipment in accordance with the manufacturers instructions and within the safe operating parameters as defined by the manufacturer.

Ground personnel should always make eye contact and wait for a signal to proceed before passing close to or in front of operating equipment or moving vehicles. When ground personnel are working in the vicinity of heavy equipment, they should inform the operator of their presence.

All drivers and operators will be expected to adhere to the speed limits, signs, and road markings.

4.2.2 Excavation Safety

- No work activities shall continue if evidence of unexplosive ordnance is encountered.
- The excavation at the site is anticipated to be 4 to 28 feet deep. If the excavation is greater than 3 feet, the following provisions would apply:
 - No one shall enter the excavation area unless it absolutely necessary. Confirmation soil samples will be collected with excavation equipment from outside the excavation only. Excavations greater than 5 feet deep will only be entered if the excavation is made safe for entry. The shoring or sloping system must be designed by a registered professional engineer (PE) licensed in the state in which the excavation will take place. The designer must be present at the site, and the system must be installed as designed.
 - All excavations shall be performed from a stable ground position. Daily inspections of the excavation shall be made by a competent person who has received training in excavation safety. The inspector shall determine the

likelihood of a cave-in, and corrective action such as sloping or shoring shall be taken if the walls appear to be unstable.

- All spoils shall be located at least 2 feet from the edge of the excavation to prevent it from falling back into the excavation. The excavation shall be guarded on all sides by barricades or caution tape at least 2 feet from the edge.
- Before excavating, the existence and location of underground pipe, electrical equipment, and gas lines will be determined. This will be done, if possible, by contacting the appropriate utility company and/or client representative to mark the location of the lines. If the client's knowledge of the area is incomplete, an appropriate device, such as a cable avoiding tool, will be used to locate the service line.

If excavating equipment is located in the vicinity of overhead power lines, a distance of 10 feet must be maintained between the lines and any point on the equipment if the line has voltage less than 50 kilovolts (kV). If the lines have voltage greater than 50 kV, this distance shall be 10 feet plus 4 inches for every 10 kV over 50 kV.

Excavation procedures are detailed in Appendix B.

4.2.3 Drilling Safety

No drilling activities are anticipated at the Carswell AFB.

4.2.4 High-Pressure Water Jetting Operation Safety

Job Setup. All machinery and mechanized equipment shall be operated only by personnel who have been trained in accordance with the original manufacturer's instructional training program, and have been qualified through demonstrating the knowledge, experience, and ability to perform the assigned task.

The jetting operator shall be responsible for the safe operation of the high-pressure water jetting equipment. To ensure the safety of the operator and nearby workers, and to ensure that proper equipment selection is followed, the manufacturer's checklist shall be completed prior to starting work.

The work area should be isolated with use of suitable barriers (i.e., rope, safety tape, barrels, etc.) to warn personnel they are entering a hazardous area. The perimeter should be outside the effective range of the jet whenever possible. The work area must be as clean as feasible to prevent slip, trip, and fall hazards.

High-Pressure Water Jetting Operations

- The equipment must be operated within the limitations specified by the manufacturer.
- The system shall incorporate at least one fluid shut-off or dump service. The orifice operator must always be able to shut down the water jet by releasing pressure on the trigger, switch, or foot valve pedal.
- Hoses shall be arranged so that a tripping hazard does not occur.
- The hoses shall be checked for evidence of damage, wear, or imperfections.
- Any electrical equipment in the immediate area of the operation that presents a hazard to the operator shall be de-energized, shielded, or otherwise made safe. Ground fault circuit interrupters (GFCI) shall be used for any necessary power hook-ups.
- Only approved safety cans shall be used to store fuel. Do not refuel equipment while it is operating.
- Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
- The minimum PPE shall be worn during jetting operations including hard hats, impact-resistant safety glasses, and safety shoes. In addition, the jetting gun operator will wear metatarsal guards for the legs and feet, hearing protection (if appropriate), a full shield, and liquid-resistant clothing.
- The jet operator shall not be distracted until the jet has stopped.
- When pressurizing the system, increase pressure slowly on the system while it is being inspected for leaks or faulty components, or both. Repair or replace components only when equipment is properly locked out and tagged.
- During jetting operations, a minimum of two persons, one at the orifice or gun and one accessible to the pump, shall be employed at all times.
- The operator and other team members shall be capable of performing the required operations safely. All shall be capable of speaking and reading the instructions and warnings in the language of their place of work.

Shotgunning

- The person operating the nozzle shall have direct control of the dump system.
- The pressurized system shall never be left unattended.
- When more than one shotgunning operation is being performed within the same area, install a physical barrier or maintain adequate spacing between operators to prevent the possibility of injury from the pressure water.
- Never manually hold objects to be cleaned.
- The point where the hose connects to the gun shall be shrouded by a protective device such as a heavy duty hose, shoulder guard, etc., to prevent injury to the operator should the hose, pipe, or fitting rupture.
- When used, the minimum length of the shotgun lance extension shall be 4 feet (1.2 meters) from the triggering device to the nozzle.
- Use steel-braided hoses on air-operated, fail-safe systems to keep the system from being activated by someone stepping on the hose or running over it.

Moleing or Flex Lancing

- The operator shall have direct control of the dump system.
- A positive method shall be used to prevent the nozzle from reversing direction inside the item being cleaned. Safety guards for this purpose shall be used.
- During manual operations, the entrance to a line or pipe shall not be cleaned with a nozzle containing back jets without adequate shielding.
- The clearance between the outside diameter of the hose, lance, and nozzle assembly and the inside wall of the item being cleaned shall be sufficient to allow adequate washout of water and debris.
- During manual operation, insert the nozzle into the tube prior to pressurizing. Conversely, depressurize the system before removing the nozzle from the tube.
- Hoses shall be conspicuously marked no closer than 24 inches (600 mm) from the nozzle to warn the operator of the nozzle location.
- Where the length of the nozzle and rigid coupling is less than the inside diameter of the pipe, a length of rigid pipe of not less than the diameter of the pipe being

cleaned shall be fitted directly behind the nozzle, or a suitable safety shield shall be provided to protect the operator. This is to prevent the nozzle from turning around 180° and doubling back towards the operator. Specific safety guards shall be used for this purpose.

Rigid Lancing

- The operator inserting the nozzle shall have direct control of the dump system.
- The clearance between the outside diameter of the lance and nozzle and the inside wall of the item being cleaned shall be sufficient to allow adequate washout of water and debris.
- When under manual operation, the nozzle shall be inserted into the tube prior to pressurizing. Conversely, the system shall be depressurized before removal of the nozzle from the tube, unless proper shielding is provided.
- When lancing tubes with a rigid lance, a guard shall be installed around the lance to prevent a lance nozzle from being inadvertently withdrawn and causing injury.
- Any water additive (chemical, detergent, or solid particle) shall be used in accordance with the manufacturer's recommendations.

4.3 Heat Stress and Cold Stress

4.3.1 Heat Illness Prevention

Heat Stress. One or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate in excess of 75 percent of their calculated heart rate (measured immediately prior to rest period):

- Site workers will be encouraged to drink plenty of water throughout the day. They will be advised to slightly increase their salt intake by lightly salting their food.
- On-site drinking water will be kept cool (50 to 60°F) to encourage personnel to drink frequently.
- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.

- The initiation of heat stress monitoring will be required when employees are working in environments exceeding 90°F ambient air temperature. If employees are wearing impermeable clothing, this monitoring will begin at 78°F. Monitoring will be conducted of the following:
 - Heart Rate - Each individual will count his/her radial (wrist) pulse as early as possible during each rest period. If the heart rate of any individual exceeds 75 percent of their calculated maximum heart rate ($MHR = 200 - \text{age}$) at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work until his/her sustained heart rate is below 75 percent of their calculated maximum heart rate.
 - Temperature - Each individual will measure his/her temperature with a thermometer for one minute as early as possible in the first rest period. If the temperature exceeds 99.6°F at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same.
 - An individual is not permitted to return to work if his/her temperature exceeds 100.4°F.
- Cooling devices such as vortex tubes or cooling vests should be used when personnel must wear impermeable clothing in conditions of extreme heat.
- Employees should be instructed to monitor themselves and coworkers for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area must be provided. All breaks should take place in the shaded rest area.
- Employees shall not be assigned to other tasks during breaks.
- Employees shall remove impermeable garments during rest periods. This includes white Tyvek-type garments.
- All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

The signs of heat stress disorders follow.

Heat Cramps. Heat cramps are caused by heavy sweating and inadequate water/electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen.

Heat Exhaustion. Heat exhaustion occurs from increased stress on various body organs. Signs and symptoms include:

- Pale, cool, moist skin
- Heavy sweating
- Dizziness, nausea
- Fainting.

Heat Stroke. Heat stroke is the most serious form of heat stress and should always be treated as a medical emergency. The body's temperature regulation system fails, and the body temperature rapidly rises to critical levels. Immediate action must be taken to cool the body before serious death or injury occurs. Signs and symptoms of heat stroke include:

- Red, hot, usually dry skin
- Lack of, or reduced perspiration
- Nausea
- Dizziness and confusion
- Strong, rapid pulse and confusion
- Coma.

4.3.2 Cold Stress Prevention

Cold and/or wet environmental conditions can place workers at risk of a cold-related illness. Hypothermia can occur whenever temperatures are below 45 degrees Fahrenheit (°F), and is most common during wet, windy conditions, with temperatures between 40 and 30°F. The principal cause of hypothermia in these conditions is loss of insulating properties of clothing due to moisture, coupled with heat loss due to wind and evaporation of moisture on the skin.

Frostbite, the other illness associated with cold exposure, is the freezing of body tissue, which ranges from superficial freezing of surface skin layers to deep freezing of underlying tissue. Frostbite will occur only when ambient temperatures are below 32°F. The risk of frostbite increases as the temperature drops and wind speed increases.

Most cold-related worker fatalities have resulted from failure to escape low environmental air temperatures or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is a fall in the deep core temperature of the body.

Site workers should be protected from exposure to cold so that the deep core temperature does not fall below 36 degrees Celsius (°C). Lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision making, or loss of consciousness with the threat of fatal consequences. To prevent such occurrence, the following measures will be implemented:

- Site workers must wear warm clothing such as mittens, heavy socks, etc., when the air temperature is below 45°F. Protective clothing, such as Tyvek or other disposable coveralls, may be used to shield employees from the wind.
- When the air temperature is below 35°F, employees must wear clothing for warmth, in addition to chemical protective clothing. This will include:
 - Insulated suits, such as whole body thermal underwear
 - Wool socks or polypropylene socks to keep moisture off the feet
 - Insulated gloves
 - Insulated boots
 - Insulated head cover such as hard hat, winter liner, or knit cap
 - Insulated jacket, with wind and water resistant outer layer.
- At air temperatures below 35°F, the following work practices must be implemented:
 - If the clothing of a site worker might become wet on the job site, the outer layer of clothing must be water impermeable.
 - If a site worker's underclothing becomes wet in any way, the worker must change into dry clothing immediately. If the clothing becomes wet from sweating (and the employee is not uncomfortable), the employee may finish the task at hand prior to changing into dry clothing.
 - Site workers will use site office trailer or company vehicles while at the Site S-1 location as a warm break area.
 - Hot liquids such as soups or warm, sweet drinks will be provided at the site or IT/OHM office trailers when needed. The intake of coffee and tea should be limited, due to their circulatory and diuretic effects.
 - The buddy system must be practiced at all times on site. Any site worker observed with severe shivering must leave the work area immediately.
 - Site workers should dress in layers, with thinner lighter clothing worn next to the body.
 - Site workers should avoid overdressing when going into warm areas or when performing strenuous activities.

4.4 Sanitation

The work site shall be kept clean and free of trash and debris. All trash will be placed in receptacles.

4.5 Biological Hazards

Biological hazards may include poison ivy, snakes, thorny bushes and trees, ticks, mosquitoes, or other pests, and medical waste.

4.5.1 Tick-Borne Diseases

Lyme Disease and rocky Mountain Spotted Fever (RMSF) are diseases transmitted by ticks and occurs throughout the United States during spring, summer, and fall.

Lyme Disease. The disease commonly occurs in summer and is transmitted by the bite of infected ticks. "Hot spots" in the United States include New York, New Jersey, Pennsylvania, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin. Few cases have been identified in other states (less than 1 in 100,000).

The disease is transmitted by the Deer tick, which is smaller and redder than the common Wood tick. The disease may be transmitted by immature ticks, which are small and hard to see. The tick may be as small as a period on this page.

Symptoms of the disease include a rash or a peculiar red spot, like a bull's eye, which expands outward in a circular manner. The victim may have headache, weakness, fever, a stiff neck, swelling and pain in the joints, and eventually, arthritis.

Rocky Mountain Spotted Fever. This disease is transmitted via the bit of an infected tick. The tick must be attached 4 to 6 hours before the disease-causing organism (*rickettsia rickettsii*) becomes reactivated and can infect humans.

The primary symptom of RMSF is the sudden appearance of a moderate-to-high fever. The fever may persist for two to three weeks. The victim may also have a severe headache, deep muscle pain, and chills. A rash appears on the hands and feet on about the third day and eventually spreads to all parts of the body. For this reason, RMSF may be confused with measles or meningitis. The disease may cause death if untreated, but if identified and treated promptly, death is uncommon.

Control. Tick repellent containing diethyltoluamide (DEET) should be used in tick infested areas, and pant legs should be tucked into boots. In addition, workers should search the entire body every three or four hours for attached ticks. Ticks should be removed promptly and carefully without crushing, since crushing can squeeze the rickettsia into the skin. A gentle and

steady pulling action should be used to avoid leaving the head or mouth parts in the skin. Hands should be protected with surgical gloves when removing ticks.

4.5.2 Poisonous Plants

Poison ivy may be present in the work area. Personnel should be alerted to its presence, and instructed on methods to prevent exposure.

Control. The main control is to avoid contact with the plant, cover arms and hands, and frequently wash potentially exposed skin. Particular attention must be given to avoiding skin contact with objects or protective clothing that have touched the plants. Treat every surface that may have touched the plant as contaminated, and practice contamination avoidance. If skin contact is made, the area should be washed immediately with soap and water, and observed for signs of reddening.

4.5.3 Snakes

The possibility of encountering snakes exists, specifically for personnel working in heavily wooded/ vegetated areas. Rocky hillsides are favorite habitats of poisonous snakes. Snake venoms are complex and include proteins, some of which have enzymatic activity. The effects produced by venoms include neurotoxic effects with sensory, motor, cardiac, and respiratory difficulties; cytotoxic effects on red blood cells, blood vessels, heart muscle, kidneys, and lungs; defects in coagulation, and effects from local release of substances by enzymatic actions. Other noticeable effects of venomous snake bites include swelling, edema and pain around the bite, and the development of ecchymosis (the escape of blood into tissues from ruptured blood vessels).

Control. To minimize the threat of snake bites and insect hazards, all personnel walking through vegetated areas must be made aware (during training) of the potential for encountering snakes and will avoid actions potentiating encounters, such as turning over logs, etc. Additional caution will be exercised around preferred snake habitat. If a snake bit occurs, an attempt should be made to kill the snake for identification. The victim should be transported to the nearest hospital within 30-minutes; first aid consists of applying a constriction band, washing the area around the wound to remove any unabsorbed venom, and omit cutting and sucking (unless medical care cannot be obtained within 30-minutes).

4.6 Noise

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on site.

Hearing Conservation. All personnel must wear hearing protection - with a Noise Reduction Rating (NRR) of at least 20 - when noise levels exceed 85 dBA. All site personnel who may be exposed to noise must also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss. Noise monitoring is discussed in Section 8.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, wherever possible barriers or increased distance will be used to minimize worker exposure to noise.

4.7 Spill Control Plan

All personnel must take every necessary precaution to minimize the potential for spills during site operations. All on-site personnel are obligated to report immediately any discharge, no matter how small, to the Site Supervisor.

Spill control apparatus will be located on site at any locations that the Site Supervisor foresees the potential for discharge to the ground. All sorbent materials used for the clean up will be containerized and labeled separately from other wastes, unless otherwise directed by the contracting officer. In the event of a spill, the Site Supervisor will follow the provisions outlined in Section 12 to contain and control released materials and to prevent spread to off-site areas.

4.8 Lockout/Tagout Procedures

Some of the work activities include demolishing utility services and pipeline to the former radar installation. It is the responsibility of the Project Manager and the Site Supervisor to work closely with Carswell AFB personnel to accurately locate all utilities. Lockout/tagout activities are anticipated, the procedures for lockout/tagout are provided in Appendix B.

Lockout is the placement of a device that uses a positive means such as a lock to hold an energy or material isolating device or system ensuring that the equipment can not be operated until the lockout device is removed. If a device cannot be locked out, a tagout system will be used. Tagout is the placement of a warning tag on an energy or material isolating device indicating that the equipment controlled may not be operated until the tag is removed.

4.9 Sanitation

Site sanitation will be maintained according to OSHA and Department of Health requirements.

4.9.1 Break Area

Breaks will be taken in a clean zone away from the active work area. There will be no smoking, eating, drinking, or chewing gum or tobacco in the work area.

4.9.2 Potable Water

The following rules apply for all project field operations:

- An adequate supply of potable water will be provided at each work site
- Portable containers used to dispense drinking water must be capable of being tightly closed, and must be equipped with a tap dispenser. Water must not be drunk directly from the container, nor dipped from the container
- Containers used for drinking water must be clearly marked and not used for any other purpose
- Disposable cups will be supplied; both a sanitary container for unused cups and a receptacle for disposing of used cups must be provided.

4.9.3 Sanitary Facilities

Access to facilities for washing before eating, drinking, or smoking will be provided.

4.9.4 Lavatory

If permanent toilet facilities are not available, an appropriate number of portable chemical toilets will be provided.

4.9.5 Trash Collection

Trash collected from the contamination reduction zone will be separated as routine hazardous waste. Trash collected in the support and break areas will be disposed of as nonhazardous waste. Labeled trash receptacles will be set up in the contamination reduction zone and in the support zone.

4.10 Electrical Hazards

Electricity may pose a particular hazard to site workers due to the use of portable electrical equipment. If wiring or other electrical work is needed, it must be performed by a qualified electrician.

General electrical safety requirements include:

- All electrical wiring and equipment must be a type listed by UL, Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.
- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or United States Coast Guard regulations.
- Portable and semi portable tools and equipment must be grounded by a multi-conductor cord having an identified grounding conductor and a multicontact polarized plug-in receptacle.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM.
- Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switch boxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
- Plugs and receptacles must be kept out of water unless of an approved submersible construction.
- All extension outlets must be equipped with ground fault circuit interrupters (GFCI).
- Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must not be fastened with staples, hung from nails, or suspended by bare wire.
- Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

4.11 Lifting Hazards

Back strain or injury may be prevented by using proper lifting techniques. The fundamentals of proper lifting include:

- Consider the size, shape, and weight of the object to be lifted. Two persons must lift an object if it cannot be lifted safely alone (e.g., >60 lbs).
- The hands and the object should be free of dirt or grease that could prevent a firm grip.
- Gloves must be used, and the object inspected for metal slivers, jagged edges, burrs, rough or slippery surfaces.
- Fingers must be kept away from points which could crush or pinch them, especially when putting an object down.
- Feet must be placed far enough apart for balance. The footing should be solid and the intended pathway should be clear.
- The load should be kept as low as possible, close to the body with the knees bent.
- To lift the load, grip firmly and lift with the legs, keeping the back as straight as possible.
- A worker should not carry a load that he or she cannot see around or over.
- When putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.

Section 5 Personal Protective Equipment

The PPE outlined in this chapter has been selected according to the site characterization and analysis, job tasks, site hazards, intended use, and duration of potential employee exposures. Maintenance and storage of PPE, decontamination, donning and doffing procedures, inspection and monitoring of effectiveness, and PPE limitations are outlined in this chapter.

5.1 Respiratory Program

Respirators will only be worn when elevated conditions has been established by the site health and safety technician conducting air sampling in the breathing zone. A comprehensive respiratory protection program has been established by IT and is required in all locations where use of such equipment is intended to lessen the potential for adverse health affects to any employee.

As part of the respiratory training program, each employee is instructed in the following elements:

- Nature of the respiratory hazard on the work site and the appraisal of potential consequences if the respiratory protection is not utilized
- Use and proper fitting of the respirator
- Cleaning, disinfecting, inspection, maintenance, and storage of the respirator
- Proper selection, capabilities, and limitations.

Routinely used respiratory equipment will be inspected, cleaned, and disinfected daily to help assure proper hygienic practices. An inspection of these breathing devices will include the following:

- Examination of the head straps for breaks, loss of elasticity, broken or malfunctioning buckles and other attachments
- Examination of the face piece for excessive dirt, cracks, tears, distortion, holes, or inflexibility
- Examination of the exhalation and inhalation valves for any foreign material, cracks, tears, or distortion in the valve. Additional checks will be made to inspect for proper insertion, defective valve covers, or improper installation.
- Examination of air purifying elements for incorrect cartridge, expired shelf life of the cartridge, cracks or dents in the cartridge or cartridge-holder

- Examination for proper insertion of the cartridges into the face-piece and a check of the gaskets inside the cartridge holder
- Examination of air cylinders for adequate air volume. Only Grade D air will be utilized for breathing air.

When Level C protection is required, respirator cartridges will be changed in accordance with the service life calculations performed by the Health and Safety Manager. All respirators will be inspected prior to each day's use. If broken or malfunctioning parts are found during the cleaning process, these parts will be replaced or new respiratory equipment will be issued to the user.

The respiratory protective equipment will be stored in an area protected from any mechanical damage. These devices will also be stored in a location that provides protection against dust, heat, excessive moisture, or damage by chemical contact. The storage area for the respirators should be in a readily accessible location.

- Only employees who have been trained to wear and maintain respirators properly will be allowed to use respiratory protection.
- Selection of respirators, as well as any decisions regarding upgrading or downgrading of respiratory protection, will be made by the H&S manager or his designee.
- Positive and negative pressure checks will be performed each time the respirator is donned.
- Only employees who have been fit tested within the last 12 months will be allowed to work in atmospheres where respirators are required.
- Respirator users will be instructed in the proper use and limitations of respirators.
- If an employee has difficulty in breathing during the fit test or during use, he will be evaluated medically to determine if he can wear a respirator safely while performing assigned tasks.
- No employee will be assigned to tasks requiring the use of respirators if, based upon the most recent examination, a physician determines that the health or safety of the employee will be impaired by respirator use.
- Air-supplied respirators will be assembled according to manufacturer's specifications. Hose length, couplings, valves, regulators, manifolds and all accessories will meet American National Standards Institute (ANSI) and the manufacturer's requirements.

- Respirators will be cleaned and sanitized daily after use.
- Respirators will be stored in a convenient, clean, and sanitary location on site.
- Respirators will be inspected during cleaning. Worn or deteriorated parts will be replaced.
- Facial hair that might interfere with a good face-piece seal or proper operation of the respirator is prohibited.
- The IT PM will review the respiratory protection program daily to ensure employees are properly wearing and maintaining their respirators and that the respiratory protection is adequately protecting the employees.
- The H&S manager and the PM will evaluate the respiratory protection program monthly to ensure the continuing effectiveness.
- Respirators used for emergency response will be inspected weekly by the SSHO.

5.2 Levels of Protection

The level of protection used in the EZ is based on site-specific information. Specific levels of protection will be changed whenever site conditions change. Levels of protection can either be increased to the next higher level or decreased to the next lower level. If the site superintendent requests a change in levels of protection, he must contact the IT H&S manager and PM. If the need arises to protect safety and health, the site superintendent can upgrade protection levels without input from the H&S manager or PM. He will then review his decision with the H&S manager, SSHO, and PM. Levels of protection will not be downgraded without prior approval from the H&S manager.

5.2.1 Level A Protection

Level A protection is not required.

5.2.2 Level B Protection

Level B protection is not required.

5.2.3 Level C Protection

Level C protection will be used if air monitoring data indicates the need for respiratory protection. The following equipment will be used for Level C protection:

- NIOSH-approved full face, air purifying respirators equipped with organic vapor/acid gas/P100 filter combination
- Hooded, permeable Tyvek, Kleenguard, or its equivalent, taped at gloves, boots, and respirator
- Nitrile or cotton gloves (outer)
- Lightweight nitrile gloves (inner)
- Steel-toed boots and overbooties
- Hard hat
- Hearing protectors (if necessary).

5.2.4 Level D-Modified Protection

Modified Level D protection is anticipated for the land fill capping activities, draining the transformer and the excavation of the hot spot areas. The following equipment will be used for Level D-Modified protection:

- Permeable Tyvek, Kleenguard, or its equivalent
- Nitrile or cotton gloves
- Steel-toed safety boots and overbooties
- Safety glasses (ANSI-approved)
- Hard hat
- Hearing protectors (if necessary).

5.2.5 Level D Protection

The minimal level of protection that will be required of IT personnel at the site will be Level D. The following equipment will be used for Level D protection:

- Coveralls or work clothing
- Steel-toed safety boots

- Safety glasses (ANSI-approved)
- Nitrile gloves (when handling solvents or potentially contaminated soils, samples and/or equipment)
- Hard hat
- Hearing protectors (if necessary).

5.2.6 Selection of PPE

The selection of the PPE has been done after a thorough evaluation of the hazards involved during each sampling task. The initial levels of PPE are as follows:

<u>Task</u>	<u>Initial Level of PPE</u>
Mobilization	Level D
Contaminated Soil Excavation, No Dust Suppression	Level C
Contaminated Soil Excavation, With Dust Suppression	Level Modified D/C
Restoration/backfill	Level D*
Landfill Capping	Modified Level D*
Building Demolition	Level D*
Removing Liquids from the Transformer	Modified Level D
Confirmation Sampling	Level D
Decontamination	Level D

*The PPE will be upgraded to Level C PPE if air monitoring results exceed action levels provided in Table 8-1. If level C PPE is worn, personal air monitoring will be conducted to ensure the adequacy of respiratory protection. Note: During excavation, only workers who come in direct contact with soils are required to wear Modified Level D, i.e., the heavy equipment operator who has no potential for skin contact with contaminated soils would not be required to wear Modified Level D.

As site activities progress, levels of PPE are subject to change or modification. Upgrading of PPE can occur when action levels are exceeded or whenever the need arises to protect the safety and health of site personnel. Levels of protection will not be downgraded without prior approval from the H&S Manager.

5.3 Using PPE

All persons entering the EZ or CRZ will don the required PPE according to established procedures in this plan to minimize exposure potential. When leaving the EZ or CRZ, PPE will be removed according to the established procedures to minimize the spread of contamination.

5.3.1 Donning Procedures for Modified Level D PPE or Higher

- Put on boots, boot covers, and coveralls, and tape the coveralls.
- Put on gloves.
- Tape the coveralls over the gloves at the wrist.
- If in Level C PPE, don respirator and check for secure fit.
- If in Level C PPE, put hood or head covering over the respirator.
- Put on remaining protective equipment, i.e., hard hat, safety glasses, etc.

One person will remain outside the work area to check that each person entering has the proper protective equipment. No persons will be allowed to enter an EZ improperly attired.

5.3.2 Doffing Procedures for Modified Level D PPE or Higher

Whenever a person leaves the work site, the following proper decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated mud and debris from boots or remove boot covers.
- Clean reusable protective equipment.
- Remove protective garments and equipment. All disposable clothing should be placed in plastic bags and labeled as contaminated waste.
- Remove respirator (if respirator was worn).
- Proceed to the clean area and dress.
- Clean respirator and prepare for next uses.
- Wash hands and face prior to leaving the decontamination area.

All disposable equipment, garments, and PPE will be bagged in two 6-mil plastic bags and properly labeled for disposal.

Section 6 Site Control

6.1 Authorization to Enter

Access to contaminated work areas is regulated and limited to authorized personnel. Only persons who have completed the following training and medical requirements will be allowed to enter the EZ and CRZ:

- Completion of 40 hours of hazardous waste operations training as defined under 29 CFR 1910.120 or 29 CFR 1926.65
- Completion of the 40-hour hazardous waste operations training within the past 12 months or completion of an 8-hour hazardous waste operations refresher
- Certification by a physician of fitness for hazardous waste operations within the last 12 months.

Personnel not meeting these requirements may enter the designated support zone only. The SSHO will maintain a list of persons authorized to enter contaminated work areas, and only personnel on the authorized persons list will be allowed within the EZ or the CRZ.

6.2 Site-Specific Orientation

No person shall be allowed on any field site without first being given a site-specific H&S orientation. This orientation will provide training on the potential H&S hazards and procedures specific to Carswell AFB, and will discuss the provisions of this SSHP. All personnel will acknowledge their attendance by signing the SSHP Acknowledgement Form.

6.3 Documentation of Certificates

Personnel entering the site to work will have satisfied the medical and training requirements of 29 CFR 1910.120. The project file will contain copies of certificates documenting status for all on-site personnel. Personnel not entering the EZ or the CRZ need not meet the requirements in Section 6.1. The PM will accommodate requests from representatives of regulatory agencies to review documentation. All visitors must present documentation of current training and medical status before being granted authorization to enter the EZ or CRZ.

6.4 Entry Log

The PM shall keep a daily roster of all on-site personnel and record the time of entry into and exit from the EZ for each person.

6.5 Entry Requirements

All personnel entering the EZ will use the required PPE. Personnel will enter and exit through the decontamination units and observe the mandatory decontamination procedures.

6.6 Emergency Entry and Exit

During emergencies, decontamination will be conducted to the extent that is possible without endangering personnel. All persons responding will be informed of site H&S hazards and health hazards associated with contaminated personnel.

Section 7 Decontamination

The construction areas will be demarcated as construction areas. The excavation (remedial) will be divided into three work zones: the EZ, a CRZ, and a support zone. The SSHO will be responsible for designation of the work zones. The EZ will be the excavation area and an area large enough to allow for movement of heavy equipment and removal of contaminated soils. The CRZ will be an area surrounding the EZ, and the SZ will be the remainder of the construction areas.

Only IT personnel and authorized visitors who have met the requirements of Section 6.1 and who are wearing the required PPE will be allowed within this zone.

Decontamination pads for equipment and personnel will be constructed at the locations shown in the final design drawings. The EZ was configured to allow access from the work areas to the decontamination pads. The remainder of the IT project area will be designated as the support zone.

7.1 Personnel Decontamination

All personnel working in the EZ must remove any protective clothing prior to entering the support zone. A portable personnel decontamination station may be set up at the egress of the EZ when required. This decontamination station may consist of either a shallow plastic pool, or overlapping sheets of plastic (thick enough to withstand traffic) with sand bags along each side. The personnel decontamination station will include:

- Trash bags to collect PPE used by project personnel when they egress the EZ
- A hand pressurized sprayer to serve as a boot rinse.

Water collected from the decontamination station will be collected and sprayed over the soil to be transported for disposal.

7.2 Equipment Decontamination

A temporary control zone will be established adjacent to the excavation. This control zone will support haulage trucks while they are being loaded. This control zone will be constructed by laying down heavy plastic sheeting (thick enough to withstand truck traffic) weighted down on the sides by sand bags.

Once each truck is loaded, the sides of the truck box and tailgate area will be swept clean while still in the control zone. Any dirt or clay accumulation on the truck tires from the excavation site will be rinsed off using a hand pressurized sprayer. Water collected in the control zone will be distributed over the soil to be transported for disposal.

7.3 Personal Protective Equipment Decontamination

Where and whenever possible, single-use, external protective clothing shall be used for work within the EZ or CRZ. This protective clothing shall be disposed of in marked containers. Depending upon subsequent analysis, this protective clothing may require disposal as hazardous waste.

Section 8 Site Monitoring

8.1 Air Monitoring

Air monitoring will be conducted by the SSHO during excavation and soil loadout activities or during any other activity that might result in contaminated soil vapors and/or particulates to become airborne. A calibrated flame ionization detector will be utilized to monitor volatile organic compounds in employee's BZs. A calibrated combustible gas/oxygen analyzer will be used to measure flammable atmospheres/oxygen deficient atmospheres. A particulate monitor will be used to measure airborne dust levels.

The action level for organic vapor contaminants and particulates is provided in Table 8-1.

All air monitoring results will be made available to the client upon request.

If Level C PPE is required, personal air monitoring will be performed using appropriate NIOSH Analytical Methods to ensure the respiratory protection is adequate for workers.

8.1.1 Air Monitoring Frequency

Air monitoring frequency and location is provided in Table 8-2.

8.1.2 Air Monitoring Equipment

The following equipment will be available for on-site utilization as required:

- Combustible gas/oxygen analyzer
- Flame ionization detector (FID)
- Miniram particulate monitor or equivalent.

All equipment shall be maintained and calibrated in such quantity and condition to adequately monitor and assess all site operations.

8.1.3 Monitoring Equipment Maintenance and Calibration

All monitoring equipment shall be calibrated and operated in accordance with the manufacturer's procedures.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the SSHO shall be responsible for immediately removing the instrument from service and obtaining a replacement unit. The specific IT or subcontractor operation for which this equipment is essential shall cease until an appropriate replacement unit is obtained.

Table 8-1

Action Levels
Carswell AFB, Texas

When in Level C Personal Protective Equipment (PPE)

Analyte	Action Level	Required Action ^a
Flammable vapors	$\geq 10\%$ LEL	Stop work, control ignition source, evacuate work area.
Oxygen	$\leq 19.5\%$ or ≥ 22	Stop work, evacuate work area.
Particulates	$\geq 10 \text{ mg/m}^3$	Stop work, evacuate work area.

When in Level D Modified/D PPE

Analyte	Action Level	Required Action ^b
Flammable vapors	$\geq 10\%$ LEL	Stop work, control ignition source, evacuate work area.
Oxygen	$\leq 19.5\%$ or ≥ 22	Stop work, evacuate work area.
Particulates	$\geq 5 \text{ mg/m}^3$	Stop work, upgrade to Level C PPE.

When in Support Zone

Analyte	Action Level	Required Action
Particulates	$\geq 1 \text{ mg/m}^3$ in BZ	Evacuate support zone and re-establish perimeter of EZ.

^a Four instantaneous peaks in any 15-minute period or a sustained reading for 5 minutes in excess of the action level will trigger a response.

^b Contact with the H&S manager must be made prior to continuance of work. The H&S manager may then initiate perimeter/integrated air sampling along with additional engineering controls.

No one is permitted to downgrade levels of PPE without authorization from the H&S manager.

Table 8-2

**Air Monitoring Frequency and Location
Former Carswell AFB, Texas**

Work Activity	Instrument	Frequency	Location
Excavation/trenching operation	Particulate Monitor	Prior to start, then continuously during operation	Breathing zone (BZ) of employees and work area
Landfill Capping	Particulate Monitor	Prior to start, then continuously during operation	Breathing zone (BZ) of employees and work area
Transformer removal	Particulate Monitor	Continuously, whenever there is a potential for exposure to PCB's	Breathing zone (BZ) of employees and work area
Building Demolition**	CG/O _x Monitor	Required for Hot Work Operations	Work Area

OV = Organic vapor.

CG/O_x = Combustible gas/oxygen.

**Note: The air monitoring for the building demolition activities may need to be revised based on sampling results for lead and asbestos.

8.2 Noise Monitoring

Noise monitoring will be conducted as required. Hearing protection is mandatory for all employees in noise hazardous areas, such as around heavy equipment. As a general rule of thumb, sound levels that cause speech interference at normal conversation distance should require the use of hearing protection.

8.3 Radiation Monitoring

Radiation monitoring equipment is not needed.

8.4 Monitoring Records

The Site Supervisor will assure that site monitoring records are complete and incorporated into the project file. The SSHO is responsible for establishing, maintaining, and forwarding all required monitoring information as described below:

- Employee name, social security number, payroll number
- The date, time, pertinent task information, exposure information
- Description of the analytical methods, equipment used, and calibration data
- Type of PPE worn
- Engineering controls used to reduce exposure.

8.5 Notification

Within five working days after receipt of personal monitoring results, the SSHO will ensure that each employee is informed in writing of the results which represent that employee's exposure. Monitoring results representative of an employee's exposure must be reported to the affected employee. When results indicate that the representative employee exposure exceeds the PEL, the employee notification must state that the PEL was exceeded, and must provide a description of the corrective action taken to reduce exposure to a level below the PEL.

8.6 Monitoring Equipment Maintenance and Calibration

All direct reading instrumentation calibrations should be conducted under the approximate environmental conditions the instrument will be used. Instruments must be calibrated before and after use, noting the reading(s) and any adjustments which are necessary. All air monitoring equipment calibrations, including the standard used for calibration, must be documented on the Field Activity Daily Log, or the calibration log. All completed H&S documentation/forms must be reviewed by the H&SM and maintained by the Site Supervisor.

All air monitoring equipment will be maintained and calibrated in accordance with the specific manufacturers' procedures. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturers' procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the SSHO must be responsible for immediately removing the instrument from service and obtaining a replacement unit. **If the instrument is essential for safe operation during a specific activity, that activity must cease until an appropriate replacement unit is obtained.** The SSHO will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

Action Levels. Table 8-1 presents airborne contaminant action levels that will be used to determine the procedures and protective equipment necessary based on conditions as measured at the site.

Section 9 Employee Training

9.1 General

All on-site project personnel shall have completed at least 40 hours of hazardous waste operations training, as required by 29 CFR 1910.120 and 29 CFR 1926.65. In addition, all field employees shall have received a minimum of 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Those personnel who completed the 40-hour training more than 12 months prior to the start of the project shall have completed an 8-hour refresher course within the past 12 months. Supervisors shall have completed an additional 8 hours of relevant H&S training. Subcontractor personnel must meet these training requirements. Documentation of IT and subcontractor training shall be maintained with the project files.

9.1.1 Site-Specific Orientation

No person shall be allowed on any field site without first being given a site-specific H&S orientation. This orientation will provide training on the potential H&S hazards and procedures specific to Carswell AFB, and will discuss the provisions of this SSHP. All personnel will acknowledge their attendance by signing the SSHP Acknowledgement Form (Appendix F).

9.1.2 Tailgate Safety Meetings

The SSHO shall conduct a tailgate safety meeting at the beginning of each shift or whenever new employees arrive at the job site once the job commences. The topics discussed at the tailgate safety meeting will include H&S considerations for the day's activities, necessary protective equipment, potential for encounters with biological hazards, problems encountered, and new operations. Attendance records and meeting notes will be maintained with the project files.

9.1.3 Material Safety Data Sheets

MSDSs for every chemical product used on site or likely to be found on site are included in Appendix C. MSDSs will also be included for hazardous chemicals use to preserve samples. The H&S manager will update this appendix as information developed during the project warrants. Site personnel whose work activities may require contact with a chemical shall be instructed in the hazards and protective measures as described in the applicable MSDS.

9.2 Site Workers' Basic Course

The following is a list of the topics covered in IT's 40-hour training course:

- General site safety

- Physical hazards (fall protection, noise, heat stress, cold stress)
- Names and titles of key personnel responsible for site H&S
- Safety, health, and other hazards typically present at hazardous waste sites
- Use of PPE
- Work practices by which employees can minimize risks from hazards
- Safe use of engineering controls and equipment on site
- Medical surveillance requirements including recognition of symptoms and signs that might indicate overexposure to hazards
- Worker right-to-know (Hazard Communication OSHA 1910.1200)
- Routes of exposure to contaminants
- Engineering controls and safe work practices
- Components of the site H&S program
- Decontamination practices for personnel and equipment
- Confined-space entry procedures
- Emergency response plan.

9.3 Supervisors' Course

Management and supervisors must receive an additional 8 hours of training presented by the IT Training Department that includes:

- General site safety and health programs
- PPE programs
- Air monitoring techniques.

9.4 First Aid and Cardiopulmonary Resuscitation

At least one employee current in first aid/cardiopulmonary resuscitation (CPR) will be assigned to the work crew and will be on the site whenever operations are ongoing. First aid and CPR training courses are offered to all IT employees. Annual refresher training in CPR and every three years for first aid is required to maintain the currency of the certificate.

9.5 Instructors

The IT Training Department, headquartered in Knoxville, Tennessee, teaches the 40-hour hazardous waste operations classes using certified environmental trainers. When training needs exceed the capacity of the training division, IT uses outside institutions. IT is recognized by EPA and listed in the Federal Register (53 FR 3982). Only similarly recognized outside training institutions may be used with prior approval of the IT Training Department.

Section 10 Medical Surveillance Program

10.1 Physical Examinations

All personnel entering the EZ or CRZ shall within the past 12 months have completed a comprehensive medical examination that meets the requirements of OSHA regulations 29 CFR 1910.120 and 29 CFR 1926.65. The annual medical includes the following elements:

- Medical and occupational history questionnaire
- Physical examination
- Complete blood count, with differential
- Liver enzyme profile
- Chest X-ray, once every 3 years, for nonasbestos workers
- Pulmonary function test
- Audiogram
- Electrocardiogram for persons older than 40 years of age, or if indicated during the physical examination
- Drug screening (if requested by client)
- Visual acuity
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director.

All employee medical clearance forms are maintained by the H&S group, within the worker's home profit center, or for subcontractors at the subcontractor's office. The examining physician provides the employee with a letter summarizing his findings and recommendations. Each employee also has the right to inspect and copy medical records.

The examining physician provides the employer with a letter confirming the worker's fitness for work and ability to wear a respirator. A copy of this letter for all project workers will be kept on site during all project site work.

Subcontractors will certify on the certification form that all their employees have successfully completed a physical examination by a qualified physician. The physical examinations shall meet the requirements of 29 CFR 1910.120, 29 CFR 1910.134, HS100, and HS101. Subcontractors must submit a completed Subcontractor Certification Form (Appendix A) and supply copies of the medical examination certificate for each on-site employee.

10.1.1 Preplacement Examination

All employees will receive a preplacement medical examination prior to assignment to field operations.

10.1.2 Annual Examination

Each year subsequent to the placement examination, all employees and subcontractors must undergo an annual examination similar in scope to the placement examination. IT employees hired prior to 1985 are not required to submit to drug screening. Chest X-rays are taken every third year. The medical and occupational history is updated with each examination.

10.1.3 Exit Examination

IT employees receive an exit examination upon leaving the company if they have not been examined within the previous 6 months. The exit examination consists of the annual examination without drug screen. The employee's immediate supervisor is to notify the home office H&S assistant within a reasonable time before the termination to allow for the necessary arrangements.

10.2 First Aid and Medical Treatment

All persons on site must report any near-miss incident, accident, injury, or illness to their immediate supervisor. First aid will be provided by the voluntary site first aider. Injuries and illnesses requiring medical treatment will be accompanied by an Authorization for Treatment form (Appendix D). The employee's supervisor will complete an injury report and conduct an accident investigation as soon as emergency conditions no longer exist and first aid and/or medical treatment has been rendered. The results of the investigation should be reported on the accident/injury investigation report. The Supervisor's Employee Injury Report (SEIR) must be completed and submitted to the H&S manager within 24 hours of the incident. The accident/injury investigation report must be submitted within 72 hours of the incident.

If first aid treatment is required, first aid kits are available at the CRZ and in all IT vehicles. If treatment beyond first aid is required, the injured should be transported to the medical facility indicated in Section 11.3.8 and Appendix E. If the injured is not ambulatory or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance/paramedics

should be summoned. If there is any doubt as to the injured worker's condition, it is best to let the local paramedic or ambulance service examine and transport the worker.

10.3 Medical Restriction

When a medical care provider identifies a need to restrict work activity, the employee's home office H&S assistant will communicate the restriction to the employee, his supervisor, and the H&S manager. The terms of the restriction will be discussed with the employee and his supervisor. Every attempt will be made to keep the employee working, while not violating the terms of the medical restriction.

10.4 Medical Records

Medical and personal exposure monitoring records will be maintained according to the requirements of 29 CFR 1910.20 and HS103, and shall be kept for 30 years after employment. Employee confidentiality shall be maintained. Employees and their authorized representatives have access to these records through the H&S assistant.

Section 11 Emergency Procedures

11.1 General

This SSHP has been developed to allow site activities to be conducted without adverse impact on the safety of the workers, the community, and the environment. Procedures included in this section address the action required in the event of extraordinary conditions that might occur at the site.

11.2 First Aid

If first aid and/or CPR is administered by site personnel, the SSHO must ensure full compliance with the requirements of Section 12, Bloodborne Pathogen Exposure Control Plan. First aid kits shall be maintained at the control access point between the decontamination and support zones and in all support vehicles. If the victim cannot be safely moved from the contaminated area, first aid necessary to stabilize the victim for safe transport shall be administered at the accident location. Appropriate decontamination of all clothing and equipment shall be followed upon leaving the contaminated area. The SSHO is responsible for administering first aid.

11.3 Emergency Response

11.3.1 Pre-Emergency Planning

During the site-specific orientation and at the daily tailgate safety meetings, all employees will be trained in and reminded of the provisions of this emergency response plan, the communication systems and evacuation routes. This plan will be reviewed and revised, if necessary, on a regular basis. This will ensure that the plan is adequate and consistent with prevailing site conditions.

11.3.2 Project Manager's Responsibilities

The PM has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public. Possible actions may involve evacuation of personnel from the site area. The PM is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified and follow-up reports completed. In the absence of the PM, the site superintendent shall assume the responsibilities of the PM. All project personnel are responsible for assisting the PM in responding to emergency situations within the capabilities of their skills, equipment, and training.

11.3.3 Evacuation Signal

Vehicle or portable air horns will be used for evacuation signals as follows:

- One long, continuous blast: Emergency evacuation of the site.

11.3.4 Emergency Equipment/Facilities

All individuals shall be familiar with the site and be able to identify the locations of the following emergency equipment:

- First aid kits
- Fire extinguishers (minimum 20 lb A:B:C)
- Emergency eye wash/portable shower
- Telephone
- PPE.

The SSHO will inspect the first aid kits prior to site work and at regular intervals during the site work to ensure any used items have been replaced.

11.3.5 Medical Emergencies

Any person who becomes ill or injured in the EZ must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed. If the patient's condition is serious, partial decontamination will be completed. As a minimum, outer garments will be removed and clean coveralls or a blanket will be used to cover the victim. First aid should be administered by the SSHO while awaiting an ambulance or paramedics.

In the event of serious injury on site, all activities will be immediately suspended and resources will be diverted until it can be ensured that response procedures are adequate and that proper assistance has been provided to ambulance or paramedics responsible for treating the injury.

All injuries and illnesses must be immediately reported to the PM or the SSHO, who will then notify appropriate off-site personnel and organizations as necessary.

For ambulance, fire, or police contacts, give the name of the road and the nearest intersection. Notify the IT PM, the client representative, and the IT H&S manager after primary emergency contacts have been made.

Attending emergency physicians should be given the telephone number of the IT medical director to obtain immediate access to an employee's medical records and for consultation purposes.

11.3.6 Emergency Contact/Notification Listing

On-Base

Fire and Emergency Rescue (817) 782-6330

Local

Fire 911
Police 911
Ambulance 911
Harris Hospital (817) 882-2000
National Response Center (800) 424-8802
Poison Control Center (800) 542-4225

11.3.7 Key Project and IT Personnel

Project Manager	Will Carter	(865) 690-3211
H&S Manager	Alison Harwood	(770) 663-1428
Program CIH	Mike Henderson	(865) 690-3211
AFCEE Oversight	Mike Dodyk	(817) 782-7167 (office) (817) 845-9729 (cellular)
SSHO	To Be Determined	

11.3.8 Directions to the Nearest Hospital

Harris Hospital, shown on the map in Appendix E, is located at:

1200 6th Avenue
Fort Worth, Texas

11.4 General Emergency Procedures

- If any member of the field crew experiences any adverse effects or symptoms of exposure while on the scene, the entire field crew shall immediately halt work and act according to the instructions provided by the SSHO.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated shall result in the evacuation of the field team and re-evaluation of the hazard and the level of protection required.
- If an accident occurs, the site supervisor must immediately complete the SEIR (see Appendix D). If necessary, follow-up action shall be taken to correct the situation that caused the accident.

11.4.1 Personal Injury

The SSHO is trained in American Red Cross first aid procedures and shall administer appropriate first aid treatment, including CPR, in emergency situations. The following general emergency procedures shall be carried out in the event of injury:

- Notify the SSHO of the incident.
- If the victim can be moved safely, remove from the EZ to the decontamination zone using established control points.
- Administer first aid.
- Call for ambulance transport, or transport victim to nearest hospital or emergency medical center, as appropriate. (Note: The SSHO shall direct the removal of injured personnel from the EZ and shall approve any necessary deviation from established decontamination procedures. Such deviation shall be based upon the severity or life-threatening nature of the injury.)
- Notify the IT PM, the client representative, and the IT H&S manager of the incident and describe the emergency response actions taken.

11.4.2 Chemical Exposure

Before entering the contaminated zone, all site personnel shall be thoroughly acquainted with the types of toxic/hazardous chemicals present on site and their potential concentrations. The following general procedures shall be followed for chemical exposure emergencies:

- Move the victim from the immediate area of exposure or contamination, taking precautions to prevent additional exposure of other individuals.
- Notify the site SSHO of the exposure incident.
- If victim can be moved safely, proceed to the decontamination zone through established control points.
- Decontaminate clothing or remove, if safe to do so.
- For skin or eye contact, thoroughly wash affected areas with water (eyes should be flushed for at least 15 minutes).
- For inhalation exposure, ensure that victim has adequate fresh air.

- Administer additional first aid treatment, as appropriate.
- Call for ambulance transport, or transport victim to nearest hospital or emergency medical center, as appropriate.
- Notify the IT PM, the client representative, and the IT H&S Manager and describe the emergency response actions taken.

NOTE: The SSHO shall direct the removal of injured personnel from the EZ and shall approve any necessary deviation from established decontamination procedures. Such deviation shall be based upon the security or life-threatening nature of the injury.

11.4.3 Fire or Explosion

In the event of a fire or explosion:

1. Immediately evacuate injured personnel and leave the area.
2. Administer first aid, as appropriate.
3. Notify emergency services.
4. Notify the IT PM, the client representative, and the IT H&S manager.

11.5 Evacuation Routes and Procedures

Evacuation routes and procedures will be developed by IT upon arrival at the site.

11.6 Spill Response

If an incidental spill occurs, the following procedures will be followed:

- Notify SSHO immediately.
- Evacuate immediate area of spill.
- Conduct air monitoring to determine needed level of PPE.
- Don required level of PPE and prepare to make entry to apply spill containment and control procedures.
- No entry will be made until atmosphere is less than 10% LEL.

- Contain spill using vermiculite or sorbent material. Cover all drains to prevent spill from entering any drainages.
- Control the spill by repositioning the container, plugging the hole, or other means to seal the leak (where appropriate).

The Project Manager has the authority to commit resources as needed to contain and control released material other than "incidental spills" and to prevent its spread to off-site areas.

Section 12 Bloodborne Pathogen Exposure Control Plan

This exposure control plan presents H&S guidelines for voluntary first aid and CPR care providers. To meet the requirements of OSHA 29 CFR 1910.151, during day shift operations, at least one person on site will adequately trained in first aid and CPR, and in the requirements of the Bloodborne Pathogens Standard as listed in 29 CFR 1910.1030, IT Procedure HS512, and the contents of this plan.

12.1 Definition

Bloodborne pathogens are those agents (i.e., bacteria, virus, fungi) found in blood components, certain body fluids, and other materials, objects or surfaces that have had contact with blood that are capable of causing human disease or death to unprotected people who came into contact with blood or blood-affected items. Diseases caused by bloodborne pathogens include, but are not limited to, hepatitis B virus (HBV), human immunodeficiency virus (HIV), hepatitis C, malaria, and syphilis. The most significant and of greatest concern are HBV and HIV.

12.1.1 Hepatitis B Virus

HBV is the major bloodborne pathogen hazard that first aid/CPR care providers are most likely to encounter. The HBV can remain infectious for up to 10 days even in dried blood. The virus adversely affects 8,000 to 10,000 workers annually, resulting in approximately 200 deaths each year.

Hepatitis Exposure Symptoms. Hepatitis means "inflammation of the liver" causing severe liver damage or cirrhosis. Exposure symptoms include fever, fatigue, nausea, vomiting, muscle aches, loss of appetite, and jaundice (yellowing of the eyes or skin). Hepatitis diagnosis is difficult because some symptoms are similar to the flu and may remain mild for an extended period of time.

Presently, no cure exists for hepatitis, but it can be prevented with a vaccination.

12.1.2 Human Immunodeficiency Virus

HIV attacks and deteriorates the body's immune system and eventually weakens it to the point that infection sets in causing the disease Acquired Immune Deficiency Syndrome (AIDS). HIV is primarily transmitted through sexual contact, but may also be transmitted through contact with blood and body fluids. HIV is not transmitted by touching or working with people who are HIV-positive.

Human Immunodeficiency Virus Exposure Symptoms. HIV leads to AIDS-related illnesses that eventually cause neurological problems, cancer, pneumonia, and death. People carry the

virus for many years of their lives without experiencing any symptoms. Upon development, symptoms may include weight loss, skin lesions, dry cough, fever, fatigue, diarrhea, or swelling of the lymph glands.

Presently, no cure exists for HIV or AIDS, and no vaccination is currently available.

12.2 Exposure Determination

The purpose of the guidelines in this plan are designed to limit occupational exposure of site workers to infectious blood materials that could result in disease or possibly death. The contents of this plan are intended to protect the IT employees trained in first aid and CPR who are responsible for administering medical assistance to site workers.

Means of Transmission. The major activity that may expose any of these IT employees to bloodborne pathogens is their response and care to on-site personal injuries or decontamination of equipment/surfaces contaminated by blood or other potentially infectious materials during the incident. Medical wastes (hypodermic needles, syringes, IV tubing) were encountered in subsurface soils during the test excavations for the RFI at Landfill LF-4

These IT employees could be subject to bloodborne pathogens during rendering of first aid or CPR by accidental exposure due to:

- Punctures through the skin with a contaminated sharp object (i.e., scissors)
- Contact or absorption of blood or blood-contaminated objects through open or broken skin (i.e., cuts, scratches, rashes)
- Blood splashes to their eyes, nose, or mouth, or other mucous membranes.
- Handling medical waste.

Workers can reduce their risk of contacting HBV or HIV by implementing the recommended work practices (outlined in this plan) before, during, and after responding to emergency medical incidents involving personal injuries.

12.3 Measures for Prevention

The establishment of work practice controls is an integral part of an effective exposure control plan in preventing accidental infection of employees. These work practices are designed to protect employees from reasonably foreseeable occupational exposures to bloodborne pathogens from blood and other potentially infectious material. The work practice controls outlined in this section are applicable to the administration of first aid in emergency situations and subsequent cleanup only.

12.3.1 Universal Precautions

Universal precautions is an approach to infection control which operates on the assumption that all human blood and bodily fluids are to be treated as if they are known to be contaminated with HIV, HBV, or other infectious diseases. Universal precautions shall be implemented whenever there exists a foreseeable potential for contact with blood or bodily fluids.

12.3.2 Engineering Controls

Due to the remote location of the worksite, the nature of work in outdoor locations with potential exposure to airborne chemical contaminants, and the potential for exposure being limited to emergency situations, the implementation of engineering controls is not feasible. Exposure control shall be accomplished through implementation of work practice controls and use of PPE.

12.3.3 Work Practice Controls

Work practice controls shall be instituted whenever foreseeable potential contact with, or exposure to, blood and bodily fluid exists. Examples of situations in which these controls are to be implemented include, but are not limited to, accidents or injuries in which administration of first aid is required, application of bandages to minor cuts and abrasions of another person, and contact with sores, wounds, or broken skin.

Following are specific work practice controls that shall be implemented:

- Open wounds or cuts will be promptly bandaged.
- Hands and face will be washed as soon as possible after administering first aid or CPR. If wash facilities are not readily available, stock disposable one-time use towelettes.
- No eating, drinking, or smoking is allowed in any work area where a potential exists for occupational exposure to blood borne pathogens.
- Nondisposable equipment or materials that have or may have blood or infectious fluid contact must be washed immediately after their use. (A 1-to-10 solution of bleach and water is recommended for proper decontamination.)
- Any clothing that becomes contacted with blood or infectious fluids shall be removed as soon as possible after administering first aid or CPR.
- No personal clothing that becomes contacted with blood or infectious fluids shall be laundered off site.

- First aid kits on site will be equipped with a pair of surgical gloves and CPR mouth pieces.

Minimization of Contact. Direct contact with blood and bodily fluids should be kept to an absolute minimum, as required in a particular situation. In situations where direct contact is likely, PPE shall be worn to help prevent infection.

Based upon professional judgment, an employee may choose to temporarily forego the use of PPE if he determines that the use of the PPE will further jeopardize his well-being or that of the injured worker. This limited application must be carefully evaluated by the employee.

If this situation does occur, IT is obligated to investigate and document the circumstances in an effort to provide alternative means to avoid further occurrence.

12.3.4 Personal Protective Equipment

The following are specific PPE items that shall be implemented:

- Always use CPR mouthpieces or ventilation devices.
- Inspect PPE prior to use to ensure it is in good working order and without flaws.
- Do not reuse gloves once removed.
- After use, remove gloves from top to bottom inside-out, not allowing unprotected skin to contact the exterior of the gloves.

12.3.5 Waste Handling

Disposable items that have or may have blood contact must be bagged separately from other trash. These wastes must be placed in leak-proof containers or bags and labeled.

A collection container for contaminated articles will be available on site. Wastes used in medical emergency treatment (i.e., gloves, towels, gauze) shall be disposed of in the infectious waste container(s). The container will be replaced as needed and will not be overfilled.

12.3.6 Waste Disposal

The waste will remain on site in approved container(s) until an approved disposal facility capable of receiving medical wastes is identified. Disposal of the infectious waste container(s) shall be in accordance with applicable local, state, and federal regulations.

12.4 Medical Requirements

The medical requirements of the exposure control plan include provision of a hepatitis B vaccination to all exposed employees, and postexposure procedures and evaluation.

12.4.1 Hepatitis B Vaccination

All potentially exposed employees will have made available to them at no cost a hepatitis B vaccination. The employee will also receive training as to the vaccine's efficacy, safety, benefits, and consequences prior to administration. The vaccination series shall be initiated within 24 hours of providing first aid/CPR in an incident and shall be administered under the supervision of a licensed physician. Employees may at their own discretion decline the vaccination, in which case documentation of declination will be completed and employees may be assigned immediately. If an employee covered by this exposure plan decides to accept the vaccination at a later date, the vaccination will be offered at that time at no cost to the employee.

12.4.2 Postexposure Procedures and Evaluation

Subsequent to all reported exposure incidents, a confidential medical evaluation and follow-up shall be made available to each employee exposed in the incidents.

Documentation Procedures. Documentation of the exposure incident shall be recorded as soon as possible, and shall include the route(s) of exposure, the circumstances surrounding the incident, and the identification of the source individual. Additionally, each incident shall be placed on the "first aid incident list" attached to the location OSHA Log of Occupational Injuries and Illnesses.

Blood Testing

Source Individuals. As soon as feasible, the source individual in an exposure incident will be asked to consent to a blood test to determine HBV and HIV infectivity. Where applicable laws require employee consent, documented consent shall be obtained prior to testing. If an employee refuses the blood test, documentation of the refusal will be made. Documentation of the test results shall be made available to the exposed employee(s). All results should be kept confidential, because criminal and civil penalties may be charged against persons negligently or willfully releasing such information, depending on local laws.

Exposed Employees. Exposed employees will be asked to consent to a blood test for HBV and HIV serological status. If consent to HIV testing is denied, the blood sample will be preserved for 90 days; within this time, the employee may elect to consent to the HIV test.

12.4.3 Postexposure Medical Evaluations

Exposed employees shall receive a healthcare professional's written opinion for postexposure evaluations. The written opinion shall include the results of the evaluation and any medical conditions resulting from the exposure incident that require further medical treatment.

12.5 Hazard Communication

12.5.1 Warning Labels

Containers used for disposal of blood contaminated supplies and waste will be labeled "biohazard."

12.5.2 Warning Signs

There are no designated areas for medical treatment on site, because first aid will be provided on an emergency basis only; therefore, warning signs are not applicable. In cases of potential exposure, observers and nonessential personnel should be verbally warned to keep a safe distance from injured personnel.

12.5.3 Employee Training Program

All associates who are first aid/CPR trained and may provide assistance shall be trained in the requirements for voluntary providers as described in HS512, this SSHP and its addenda, and the general provisions of HS512.

12.6 Record Keeping

12.6.1 Training Records

All employees selected to attend the training program that covers the contents of this plan shall sign the Acknowledgment Form and the Training Attendance Form.

The training record will contain the date, training outline, name and qualifications of the trainer, and names and job titles of attendees.

At the completion of the training program, all participants must take and pass the training quiz.

The training records will be maintained by the IT Training Department for at least 3 years from the training date.

12.6.2 Medical Records

Medical records necessary for IT employees must include documentation of HBV vaccination status, medical follow-up, postexposure testing, and a medical professional's written evaluation.

Confidentiality. The employee medical records will be forwarded to Washington Occupational Health Associates Consulting Services for inclusions in the employee's medical file.

Maintenance and Transfer of Records. IT shall maintain the employee medical records for the duration of the employee's employment plus 30 years thereafter.

If, for whatever reason, IT no longer does business and no successor exists, IT will notify the director of NIOSH in writing 3 months prior to the disposal of records. If so directed, the records shall be transferred to the director of NIOSH.

12.6.3 Incident Recording

An incident that occurs as a result of rendering emergency medical care will be recorded on the OSHA 200 log as OSHA defines work-related injuries and illnesses. All injuries involving the release of blood or bodily fluids must be immediately reported to the H&S department to ensure proper reporting and followup.

Appendix A

Subcontractor Certification

Subcontractor Certification

I, _____ an agent of _____,
do hereby certify that the following employees have successfully completed a 40-hour training
course which complies with the provisions of 29 CFR 1910.120/29 CFR 1926.65, and respiratory
protection training which complies with 29 CFR 1910.134. Each employee has successfully
completed a medical examination which complies with the above regulations.

Individual copies of certification of successful completion of the required training and medical
examinations will be provided to the site safety and health officer.

Signature

Date

Appendix B

IT Procedures

Lockout/Tagout Procedure

Excavation Safety Procedure

High Pressure Water Jetting Operations

PROCEDURE

Subject: CONTROL OF HAZARDOUS ENERGY AND HAZARDOUS MATERIAL SOURCES (LOCKOUT/TAGOUT)

1.0 PURPOSE AND SUMMARY

This procedure establishes the minimum requirements for the lockout and tagout of energy and hazardous material sources and must be used to:

- Ensure that all machinery, equipment, or confined spaces are isolated from all potential hazard sources (mechanical, electric, chemical hazards, etc.) and are locked out and tagged out prior to employees performing any servicing, maintenance, or entry activities.
- Ensure that field projects where hazardous energy/material sources are present develop a site-specific Lockout/Tagout procedure.
- Ensure that equipment can accommodate locks. Additional means such as a tagout program may be used to ensure safety when locks are not used.
- Establish procedures for release of the Lockout/Tagout that include machine inspections, notification and safe positioning of workers, and removal of the Lock/Tag.
- Ensure the use of standardized locks and tags that identify the worker using them, making sure that locks and tags are of sufficient quality and durability to ensure their effectiveness.
- Provide the necessary employee training.

For a basic overview of the Lockout/Tagout System refer to the "Flow Diagram - Overview: Lockout/Tagout System" (Attachment 2).

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3.0 RESPONSIBILITY MATRIX

3.1 Procedures Responsibility

The Corporate Director of Health & Safety is responsible for the issuance, revision and maintenance of this procedure.

3.2 Action/Approval Responsibilities

The Responsibility Matrix is Attachment 1.

4.0 DEFINITIONS

Affected Employee - An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout and tagout, or whose job requires the employee to work in an area in which isolation of hazards is necessary to provide a safe workplace.

Authorized Employee - A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance.

Blanking or Blinding - The absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or skillet blind) that completely covers the bore, and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.



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Capable of Being Locked Out - An energy/hazard isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy/hazard isolating device or permanently alter its energy control capability.

Double Valve and Vent - A valve arrangement in a piping system in which three valves are arranged in conjunction with a vent line. One valve is upstream of the vent, another downstream, and one is on the vent itself. To isolate the downstream system, the vent valve is opened, the other two are closed, and all three valves are locked in this position.

Energized - Connected to an energy source or containing residual or stored energy.

Energy Isolating Device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy Source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Group Lock Box - A device capable of holding and securing the key or other release mechanism for a group lock, which can accommodate the individual locks from all members of the work crew.

Hot Tap - A procedure used in repair, maintenance, and service activities which involves welding on a piece of equipment (pipeline, vessel or tank) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Lockout - The placement of an energy/hazard isolating device, in accordance with an established procedure, which ensures that the equipment being controlled cannot be operated until the device is removed.

Lockout Device - A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy/hazard isolating device in the safe position and prevent the energization of a machine or equipment. This includes blank flanges and bolted slip blinds.

Normal Production Operations - The utilization of a machine or equipment to perform its intended production function.

Qualified Employee - An employee whose skills and training meet or exceed 29 CFR 1910.332(b)(3) for work on or near exposed energized parts must, at a minimum, be trained in and familiar with the skills and techniques necessary to distinguish exposed live parts from other



parts of electric equipment; to determine the nominal voltage of exposed lines; and the clearance distances to which the qualified persons will be exposed.

Servicing and/or Maintenance - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming machines or equipment, making adjustments or tool changes, where the employee may be exposed to an unexpected energization or start-up of the equipment, or release of hazardous energy/or material.

Setting-up - Any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout - The placement of a tagout device on an energy/hazard isolation device, in accordance with an established procedure, to indicate that the device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolation device in accordance with an established procedure, that indicates that the device and the equipment being controlled may not be operated until the tagout device is removed.

5.0 TEXT

5.1 Scope/Application

This procedure covers any activity which requires isolation of a source of energy or hazardous material, such as, the servicing and maintenance of equipment and confined space entry. It outlines methods to prevent the unexpected energization or start-up of the equipment, or release of stored energy or material that could cause injury to employees.

For any projects planned for more than 30 days with lockout/tagout planned for more than seven calendar days or when locking/tagging out specialized equipment having its own lockout requirements, a site-specific/equipment specific plan must be developed and incorporated as part of the Site-Specific Health and Safety Plan. Otherwise Attachments 4-7 (discussed later in text) must be utilized to document lockout/tagout.

In situations where our client has specific lockout/tagout requirements, IT personnel can follow client procedures after an IT health and safety professional has approved them as being at least as protective as IT procedures. In such cases, the client procedures shall be incorporated into the IT health and safety plan and all affected employees trained on these procedures.

5.1.1 Exclusions. Normal operations including repetitive, routine minor adjustments that do not require removal of equipment guarding.

When work is conducted on equipment where an employee has direct control over the cord(s) or plug(s) connected to the associated equipment.

5.1.2 References. OSHA General Industry Standard, 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout), 29 CFR 1910.146, Permit-Required Confined Spaces, and 29 CFR 1910.331-335, Safety-Related Work Practices.

5.2 Responsibility

Each new, transferred, authorized or affected employee and other employees whose work operations are or may be in an area where lockout/tagout procedures are utilized must be instructed in the purpose and use of this lockout/tagout procedure.

- **All Personnel**

All site personnel will be responsible for continuous adherence to the health and safety procedures during the performance of assigned work. In no case may work be performed in a manner that conflicts with the intent of this procedure.

- **Authorized Employee**

The authorized employee, or his/her designee, is responsible for reviewing the planned activities prior to commencement of work and confirming that the maintenance manager or his designee of the particular facility where the work is to be accomplished is made aware of the nature and extent of the work and when it is to commence.

- **Site Supervisor**

The site supervisor is responsible for verifying that all proper lockout/tagout procedures have been followed. The site supervisor must ensure that the power disconnects, appropriate attachment of locks and tags, and proper documentation of the procedure are implemented. He/she is also the designated custodian and controller for all locks, tags, and group lock boxes issued to authorized employees.

- **Subcontractors, Visitors and Other On-Site Personnel**

Subcontractors are responsible for the health and safety of their employees and for complying with the requirements established by the site Health & Safety Plan. All IT subcontractors and visitors are responsible to the IT site supervisor.

- **Site Health and Safety Coordinator**

The health and safety coordinator will assist in compliance with the other applicable company policies and procedures, and the Health and Safety Plan.

5.3 Procedures for Lockout/Tagout

Lockout and tagout devices must be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

Locks are to be used when a machine, equipment, or piping system is capable of being locked out. All locks must be accompanied by a tag to indicate the name of the employee applying the lockout device and warn against the hazard if the valve is opened, or the machine/equipment is energized. A legend such as "This lock and tag to be removed only by authorized personnel" with an additional message: "Do Not Start," "Do Not Open," "Do Not Close," "Do Not Energize," or "Do Not Operate" must be utilized.

All tags and their means of attachment must be sturdy enough to prevent inadvertent removal. The tag attachment will be attachable by hand, self-locking, non-releasable, and non-reusable, with a minimum unlocking strength of not less than 50 pounds. Tags must be durable and not deteriorate from exposure to weather conditions and corrosive environments or cause the message on the tag (hand-written or pre-existing) to become illegible. Lockout and tagout devices must be singularly identified; must be the only device(s) used for controlling energy; and must not be used for other purposes.

All equipment must be designed with a hazardous energy/material isolating device as a means of protection for the employee against injury during repairs. **All new equipment installed must be designed to accept a lockout device.**

Authorized padlocks will be assigned to each authorized employee. Each group's lock will be individually keyed and the supervisor on each shift will maintain possession of the master key for these padlocks. The specific project must provide a sufficient number of locks for each employee on site.

All tags must contain the authorized employee name, date of application of the lock, equipment name or number and the reason for lockout. The tag must be attached to the lockout device.

On any equipment that can start automatically, the main disconnect must be switched to the "off" position, locked, and tagged by the authorized employee. This switch must be turned off before opening the main power disconnect and remain off until the disconnect is closed. Locking out 220v, 440v and other equipment must always be done at the main feed or starter panel.

All hazardous material lines must be blanked, blinded, or double valve and vent locked to prevent release of hazardous material.

Blanking or blinding of hazardous material lines are preferable to the double valve and vent technique. All blanks and blinds must be identified with tags in the same manner as locks.

A "Lockout Log" (Attachment 3) must be maintained by the site supervisor. This log must be included in the Health and Safety Plan.

5.3.1 Lockout/Tagout Overview

- Check equipment file for specific lockout/tagout procedures.
- Determine the requirements for lockout. If there is more than one energy source to the equipment, document each source.
- Conduct a survey to locate and identify all energy isolation devices that apply to the equipment.
- Use the equipment type-specific procedures as outlined in Attachments 4-7, if applicable. Complete the "Lockout/Tagout Procedure for Specific Equipment" form (Attachment 8) logging all data and return to the site-supervisor.
- Shut off energy source(s) to affected equipment.
- Affix lock(s) and tag(s) to each energy source controlling device.
- Identify work on process lines or vessels and determine isolation requirements.
- Blind, blank, disconnect, or double valve and vent all hazardous material lines, including steam, and identify the isolation points with tags.
- When only tag is used because machine or equipment can't be locked out, the following steps must be taken: Remove fuses, block machine, etc. and complete the "Lockout/Tagout Procedure for Specific Equipment" form (Attachment 8) and give to the site supervisor for the record.
- Stored energy - Relieve all stored energy from capacitor banks, springs, compressed air, hydraulic, steam, etc.
- Verify isolation of energy has occurred by attempting to activate equipment by using the on/off switch.
- Return control switch to "off" position before proceeding with work.

5.3.2 Removal of Lockout/Tagout

- Ensure that nonessential items, such as tools, etc., are removed from equipment.
- Ensure that equipment components are intact.
- Check work area to ensure that all employees are safely positioned or removed from the area.
- Notify all affected employees and site supervisor before re-energizing the equipment.
- Remove lockout/tagout device.
- Re-energize equipment or open valves and restore flow in process line, place back in into service.

5.3.3 Preparation for Confined Space Entry

1. Refer to IT Procedures HS300, HS301, or HS302 for Confined Space Entry.
2. Blank or blind piping, identify with tags.
3. Misalign or remove sections of lines, pipes, or ducts, identify with tags.
4. Double valve and vent system, identify with tags.
5. Lockout or tagout all sources of energy.
6. Block or disconnect all mechanical linkages.

If it is impossible or impractical to lockout a piece of equipment, the site supervisor, H&S Professional, and the Maintenance Engineer of the facility must approve a method to make the equipment safe before any activities beyond normal operations of the equipment are performed. This can be done by disconnecting wiring, removing fuses, disconnecting or blanking supply lines, etc. "Danger - Do Not Operate" tags must be used to describe the condition.

The practice of permitting a person to place or remove a lock for someone else is prohibited. No employee can be sure he/she is safe until he/she places their own lock correctly.

5.4 Safety Audit

- 5.4.1 Verification Audit.** A periodic audit of the lockout/tagout system must be performed to ensure that the requirements of this procedure are being implemented. The audit will be conducted by authorized and qualified employees other than the ones(s) utilizing the procedure being inspected. Any deficiencies that are

observed must be corrected immediately. For each project, the site-supervisor will be responsible for daily audits of lockout/tagout systems to ensure proper installation of locks and tags to the equipment and adherence to the appropriate procedures.

Where lockout or tagout is used for energy control, the periodic inspection must include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

5.4.2 Follow-up Audit. A follow-up audit must be conducted to ensure that all deficiencies noted have been corrected.

5.4.3 Documentation. Audit documentation must identify the machine or equipment on which the lockout procedure is being utilized, the date of the inspection, employees interviewed and employee(s) performing the inspection. The audit results must be provided to the Health & Safety Department to be documented as being performed.

5.5 Training

Training must be provided to ensure that the purpose and function of the energy control program are understood by employees, and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees.

- Each authorized employee must receive training in the recognition of applicable hazardous energy/material sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for isolation and control.
- All affected employees must be instructed in the purpose and use of the lock and tag system.
- All other employees (including new hires) whose work operations are or may be in an area where lockout/tagout may be utilized, must be instructed about the procedure, and the prohibition relating to attempts to restart or re-energize machines or equipment that are locked out or tagged out.
- Retraining must be conducted for all authorized and affected employees whenever there is a change in job assignment, change in equipment, changes in a process that presents a new hazard or there is a change in the lockout/tagout procedure. Retraining must also be conducted whenever there is significant evidence, based on the periodic audits, indicating employee deviation from, or lack of understanding of, the lockout/tagout procedure.

- Employee site-specific training must be documented to ensure that it has been accomplished and is being kept up to date. The documentation must contain each employee's name and dates of training.

Documentation of employee training and retraining must be maintained and kept up to date by the IT H&S representative and forwarded to the IT Training Department.

5.6 Shift or Personnel Changes

Specific procedures must be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection. These must include provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment or the release of stored energy. All site-specific locks in place must be covered in the tailgate safety meetings on each shift.

All individual lock(s) of the outgoing shift working on equipment will be removed and replaced by the on-coming shift's individual lock(s). The authorized employees of the on-coming shift must inspect and "try" the system to ensure de-energization.

The site supervisor must re-audit the system as necessary.

5.7 Troubleshooting

Special precautions must be observed when the authorized employee must perform maintenance troubleshooting tasks with energized equipment. This function requires added caution and communications between all other affected employees to ensure employee protection.

An authorized employee must identify all start-stop locations and circuit breakers for disconnecting equipment. All other affected employees must be kept informed throughout the testing and troubleshooting. If the job is left incomplete, the authorized employee must install his/her individual lock and tag before leaving the job.

The following sequence must be followed when troubleshooting any equipment:

1. Written approval including detailed work plan, must be obtained from the site supervisor and H&S Professional to ensure that troubleshooting can be performed safely.
2. Inspect and clear machine or equipment of all tools and unnecessary materials.
3. Ensure that all affected employees are positioned out of the way of machine activation. Instruct all affected employees in the procedures that must be followed, the potential hazards that may exist, and the safety precautions that have been taken. Document this training on the Tailgate Safety meeting form.

4. Remove the lockout and tagout devices.
5. Energize and proceed with the troubleshooting, testing or positioning of the machine or equipment.
6. De-energize, reapply all lockout and tagout devices and "try" the system to ensure de-energization or place machine back into service.

5.8 Group Lockout/Tagout

When servicing and/or maintenance is performed by a crew, craft, department or other group, the work crew must use a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

- Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device.
- Provision for the authorized employee to ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine or equipment; and
- When more than one crew, craft, department, etc. is involved, assignment of overall job-associated lockout or tagout control responsibility to an authorized employee to coordinate affected work forces and ensure continuity of protection; and
- Each authorized employee must affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and must remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

The following procedure applies to distribution and utilities systems. The employee authorized to "Group Lockout" will lock and tag out the system. Using the "group lockout" locks and tags. The "Group Lockout" must be signed by the authorized employee.

1. Use of personal tags and locks on the "Group Lock Box" must follow the normal lockout/tagout procedure.
2. The authorized employee must verify that all energy sources are in a neutral state.
3. The authorized employee places the group lock and tags on the hazard isolation device.

4. The authorized employee then places the "Group Lock Key" in the "Group Lock Box", and tag the box with a "DANGER DO NOT OPERATE" tag stating which system is locked out and why.
5. Each employee, prior to working on the "Group Lockout" system, must attach his/her personal tag and lock to the "Group Lockout Box."
6. Upon completion of work, all employees must remove their personal lock and tag.
7. The authorized employee must then remove the "Group Lock" locks and tags and follow normal procedures for restoring energy.
8. If repairs take more than the initiating shift, and the authorized employee is not remaining on the job for the completion, he/she may transfer "Authorization" to another employee by stating so on the "DANGER DO NOT OPERATE" tag. The employee identified then becomes the authorized employee. He/she is now authorized to remove the "Group Lockout" locks and tags installed by the original authorized employee if the work is completed on that shift. The follow-up shift must then follow normal procedures for "Group Lock/Tagout."

5.9 Outside Personnel (Contractors, etc.)

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer must inform each other of their respective lockout or tagout procedures.

All subcontractor's lockout/tagout procedures must be reviewed and approved by IT prior to the project.

5.10 Special Situations

If lockout/tagout lasts for more than one shift, the appropriate protection must not be interrupted. No lock is to be removed until the next shift is ready to lockout the equipment.

When the employee(s) who originally applied a lock(s) is not at the site to remove it, the lock can be removed only in an emergency and only under the direction of an authorized employee, the site-supervisor, and if applicable the site-safety and health coordinator. Such actions and associated personnel safeguards shall be documented on the Field Activity Daily Log and the Lockout Log.

6.0 EXCEPTION PROVISIONS

Variances to this procedure shall be requested in accordance with procedure HS013 Health and Safety Procedure Variances.

7.0 CROSS REFERENCE

HS050	Training Requirements
HS052	Health and Safety Plans
HS300	Confined Spaces
HS301	Confined Spaces, Marine
HS302	Confined Spaces, Leaded Product
HS310	Hazardous Waste Operations
HS311	Emergency Response Operations
HS312	Hazardous Waste Operations at TSD Facilities

8.0 ATTACHMENTS

1. Responsibility Matrix
2. Flow Diagram - Overview: Lockout/Tagout System
3. Lockout Log
4. Lockout/Tagout for Electrical Equipment
5. Lockout/Tagout for Compressed Air and Gases
6. Lockout/Tagout for Steam, Water, and Fluid Lines
7. Lockout/Tagout for Hydraulic Equipment
8. Lockout/Tagout Procedure for Specific Equipment

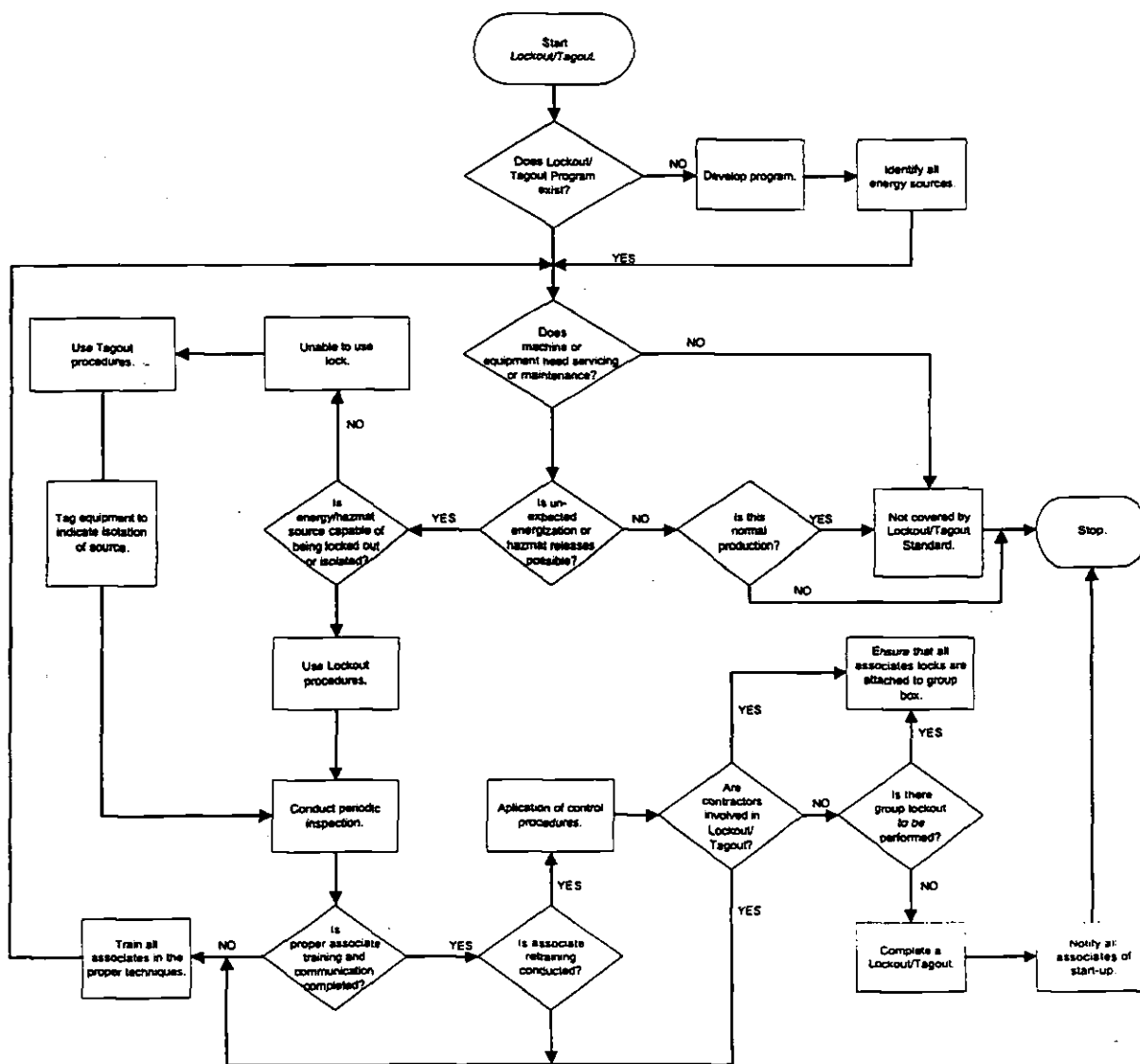
ATTACHMENT 1
CONTROL OF HAZARDOUS ENERGY SOURCE (LOCKOUT/TAGOUT)

Responsibility Matrix

Action	Procedure Section	Responsible Party						
		Location Mgr.	Authorized Associate	Site Supervisor	Sub-contractor	HS	All	Training Dept.
Comply with procedure	5.2				X		X	
Review plan & notify maintenance	5.2		X					
Verify proper procedures followed	5.2	X		X		X		
Verification audit - daily	5.4.1			X				
Provide training to associates	5.5	X						
Attend appropriate training	5.5						X	
Maintain training records	5.5							X
Write/approve location lockout plan, if required	5.1		X			X		

ATTACHMENT 2

FLO DIAGRAM:
OVERVIEW of the LOCKOUT/TAGOUT SYSTEM



HS3152/MSIO

These standard policies and procedures are applicable to all members of The IT Group, Inc., except where superseded or modified by the member Company.



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ATTACHMENT 4 LOCKOUT/TAGOUT FOR ELECTRICAL EQUIPMENT

Job: _____

Device: _____

Location: _____

Authorized Person: _____

Site Supervisor: _____

PREPARATION FOR SHUTDOWN

1. Determine power type and shutoff location
2. Determine if there is more than one energy source
3. Determine magnitude of power (voltage)
4. Notify affected employees in the area that equipment will be under lockout for maintenance.
5. Shutoff power sources to machine.

LOCKOUT/TAGOUT

6. Lock and tag main power switches in the OFF position, remove fuses.
7. Verify that no power is available to the equipment using a voltmeter, if necessary.
8. Drain devices such as capacitor banks.
9. Verify that these devices have no stored energy by use of the voltmeter.
10. Repair equipment.

RETURN TO SERVICE

11. Be sure all connections are made and any unused tools and equipment are removed.
12. Remove lock if necessary to verify machine is repaired. The maintenance employee, while verifying the machine is repaired cannot leave the immediate area.
13. Remove tag from machine.
14. Notify employees in the area that the equipment is available.

Signature: _____

Authorized Person: _____

Site Supervisor: _____



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ATTACHMENT 5
LOCKOUT/TAGOUT FOR COMPRESSED AIR AND GASES

Job: _____

Device: _____

Location: _____

Authorized Person: _____

Site Supervisor: _____

PREPARATION FOR SHUTDOWN

1. Determine types and shutoff location
2. Determine if there is more than one energy source
3. Determine magnitude of compressed air, gas, steam, water, or fluids.
4. Notify affected employees in the area that equipment will be locked out for maintenance.
5. Shutoff main supply to machine.

LOCKOUT/TAGOUT

6. Lock and tag main supply in the OFF position.
7. Bleed line and verify that no air or gases remain in the equipment.
8. Repair equipment.

RETURN TO SERVICE

9. Be sure all connections are made and any unused tools and equipment are removed.
10. Remove lock if necessary to verify proper operation.
12. Remove tag.
13. Notify employees in the area that the equipment is available.

Signature: _____

Authorized Person: _____

Site Supervisor: _____



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ATTACHMENT 6
LOCKOUT/TAGOUT FOR STEAM, WATER, AND FLUID LINES

Job: _____

Device: _____

Location: _____

Authorized Person: _____

Site Supervisor: _____

PREPARATION FOR SHUTDOWN

1. Determine types and shutoff location
2. Determine if there is more than one energy source
3. Determine magnitude of compressed air or gas.
4. Notify affected employees in the area that equipment will be under lockout for maintenance.
5. Disconnect/shutoff main steam, water or fluid lines to equipment.

LOCKOUT/TAGOUT

6. Lock and tag main supply (i.e. chaining through valve handle with lock) in the OFF position with a bleeder open on the load side.
7. Drain fluids from shutoff valves to equipment.
8. Repair equipment.

RETURN TO SERVICE

9. Be sure all connections are made and any unused tools and equipment are removed.
10. Remove lock if necessary to verify machine is repaired. The maintenance employee cannot leave the immediate area, while verifying the machine is repaired.
11. Remove tag from machine.
12. Notify employees in the area that the equipment is available.

Signature: _____

Authorized Person: _____

Site Supervisor: _____



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ATTACHMENT 7
LOCKOUT/TAGOUT FOR HYDRAULIC EQUIPMENT

Job: _____

Device: _____

Location: _____

Authorized Person: _____

Site Supervisor: _____

PREPARATION FOR SHUTDOWN

1. Determine types and shutoff location
2. Determine if there is more than one energy source
3. Determine magnitude of energy (pressure).
4. Notify affected employees in the area that equipment will be under lockout for maintenance.
5. Shutoff main hydraulic to equipment.

LOCKOUT/TAGOUT

6. Lock and tag main supply in the OFF position.
7. Drain fluids from shutoff valves to equipment.
8. Verify that the hydraulic fluid is disconnected.
9. Block ram or items controlled by the hydraulic system using the appropriate blocking.
10. Repair equipment.

RETURN TO SERVICE

11. Be sure all connections are made and any unused tools and equipment are removed.
12. Remove lock if necessary to verify machine is repaired. Maintenance employee cannot leave the immediate area, while verifying the machine is repaired.
13. Remove tag from machine.
14. Notify employees in the area that the equipment is available.

Signature: _____

Authorized Person: _____

Site Supervisor: _____



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**ATTACHMENT 8
LOCKOUT/TAGOUT PROCEDURE FOR SPECIFIC EQUIPMENT**

Equipment:

Cat. No. and Location:

Serial Number (if available):

Electrical: Voltage: Location:

Describe:

Air (Type): Location:

Describe:

Gases (Type): Location:

Describe:

Steam (Type): Location:

Describe:

Water: Location:

Describe:

Fluids: Location:

Describe:

Hydraulic: Location:

Describe:

Stored Energy- Capacitors, Springs, Etc.:

Describe:

LOG DATA AND RETURN TO SITE-SUPERVISOR

PROCEDURE

Subject: EXCAVATION AND TRENCHING

1.0 PURPOSE AND SUMMARY

The purpose of this procedure is to describe the company requirements for excavation and trenching safety. These requirements are based on the federal Occupational Safety and Health Administration (OSHA) excavation standard found in 29 Code of Federal Regulations (CFR) 1926, Subpart P.

Some company activities are likely to occur in states or localities that either currently have or will have requirements that differ from those contained within the federal standard. In such circumstances, the local health and safety representative will be responsible for ensuring that these requirements are included in either a site health and safety plan or a similar document and conveyed to all affected employees. If federal, state, or local regulations vary or conflict, the more protective requirements and practices will be followed.

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- 2.0 Table of Contents
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 - 3.1 Procedure Responsibility
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5.2.13 Fall Protection

6.0 Exception Provisions

7.0 Cross Reference

8.0 Attachments

3.0 RESPONSIBILITY MATRIX

3.1 Procedure Responsibility

The Vice President of Health & Safety is responsible for the issuance, revision, and maintenance of this procedure.

3.2 Action/Approval Responsibilities

The Responsibility Matrix is Attachment 1.

4.0 DEFINITIONS

Accepted Engineering Practices

Those requirements or practices which are compatible with standards required by a registered professional engineer.

Angle of Repose

The greatest angle above the horizontal plane at which a material will lie without sliding.

Benching

A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels of steps, usually with vertical or near-vertical surfaces between levels.

Competent Person

An employee who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees and who has the authority to take prompt corrective measures to eliminate them.

Company

All wholly-owned subsidiaries of the IT Group, Inc.

Excavation

Any man-made cut, cavity, trench or depression in an earth surface, including its sides, walls, or faces, formed by earth removal.

Registered Professional Engineer

An individual currently registered as a professional engineer (preferably civil) in the state where work is to be performed.

Sheeting

Members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield

A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Shields may be pre-manufactured or job-built in accordance with 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields".

Shoring

Structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping

A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Support System

A structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated Data

Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench

A narrow (in relation to its length) excavation made below the surface of the ground. In general, the depth is greater than the width at the bottom, but the width of a trench at the bottom is not greater than 15 feet.

Type A Soil

Cohesive soils with an *unconfined* compressive strength of 1.5 ton per square foot (tsf) (144kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, soil is NOT Type A if:

- The soil is fissured;
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects;
- The soil has been previously disturbed;
- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or

- The material is subjected to other factors that would require it to be classified as a less stable material.

Type B Soil

This classification refers to:

- Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa)
- Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and, in some cases, silty clay loam and sandy clay loam.
- Previously disturbed soils except those which would otherwise be classified Type C soil;
- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subjected to vibration;
- Dry rock that is not stable; or
- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C Soil

This classification refers to:

- Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less;
- Granular soils including gravel, sand, and loamy sand;
- Submerged soil or soil from which water is freely seeping;
- Submerged rock that is not stable; or
- Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

5.0 TEXT

5.1 Pre-Excavation Requirements

- 5.1.1 Underground Utilities.** Prior to opening an excavation, the estimated location of underground utilities such as sewer, telephone, fuel, electric, water, or any other underground installation that may be reasonably expected to be encountered during the excavation work shall be determined.



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Utility companies or a utility location service shall be contacted within the established pre-notification time, advised of the proposed work, and asked to delineate the location of all underground utilities. Employees should be careful to protect and preserve the utility markings until they are no longer required for safe excavation. At least 3 feet of clearance between any underground utility and the cutting edge or point of powered excavation equipment will be maintained until the precise location of the utility is determined. Initial excavation within this 3 foot area will be conducted manually.

5.1.2 Surface Encumbrances. All surface encumbrances (trees, poles, boulders, etc.) that may create a hazard to employees shall be removed or supported.

5.1.3 Vehicular Traffic. Employees exposed to vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material. Traffic control devices (i.e., barricades, signs, cones, flagpersons, etc.) shall be specified and used in accordance with regulations applicable to the roadway or area in which excavation activities are occurring.

5.1.4 Training. Those who supervise the entry of personnel into an excavation must have completed a training course that included instruction in:

- Types of hazards associated with excavation operations;
- Safe work practices and techniques;
- A review of applicable Federal, state and local regulations; and
- A review of this procedure.

Employees who enter excavations are required to complete a site-specific training session to enable them to recognize unsafe conditions in and around the excavation. This training can be conducted during a tailgate safety meeting that emphasizes the specific excavation hazards that may be encountered.

Training documentation shall be maintained in the project file with a copy forwarded to the Knoxville Training Department.

As part of standard employee supervision process, training shall be complemented with on-the-job instruction and reinforcement of accepted practices to the extent necessary to assure compliance with this procedure and all other applicable regulations.



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5.2 Excavation Work Practices

5.2.1 General. Each employee working within an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with 29 CFR 1926 Subpart P, except when the excavation is made entirely in stable rock or when the excavation is less than 5 feet deep and examination of the ground by a competent person provides no indication of a potential cave-in. A competent person shall ensure that protective systems, when required, are installed and maintained per the design specifications.

No employees shall be permitted to enter an excavation unless it is absolutely essential to do so and all requirements of this procedure are met.

5.2.2 Supervision. Work in an excavation shall at all times be supervised by a competent person. This individual will remain outside of the excavation at all times, and will be responsible for identifying any unusual developments above ground which may warn of impending earth movement.

5.2.3 Soil Classification. Based on the results of tests described in Attachment 3, the competent person will classify each soil/rock deposit as stable rock, Type A, Type B, or Type C. When layers of soil/rock exist, the weakest layer will be classified; however, each layer may be classified individually when a more stable layer lies under a less stable layer. If the properties or conditions of a soil/rock deposit change in any way, re-evaluation will be required.

5.2.4 Access and Egress. Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 or more feet in depth so as to require no more than 25 feet of lateral travel for employees.

5.2.5 Protective Systems. Protective systems shall be designed in accordance with 29 CFR 1926.652(b) or (c) and shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

5.2.6 Exposure to Falling Loads. No employees shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or



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unloaded provided the vehicles are equipped with a cab shield and/or canopy adequate to protect the operator from shifting or falling materials.

5.2.7 Warning System for Mobil Equipment. When mobile equipment is operated adjacent to an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs.

5.2.8 Hazardous Atmospheres. Where an oxygen deficient (less than 19.5% O₂) or hazardous atmosphere exists, or could reasonably be expected to exist, the excavation shall be tested before employees enter. Testing shall be conducted as often as necessary to ensure that the atmosphere remains safe. Some excavations may be considered confined spaces which require compliance with IT Procedure HS300.

Adequate precautions shall be taken to prevent employee exposure to oxygen deficient or hazardous atmospheres. As appropriate, ventilation and/or respiratory protective devices shall be used.

5.2.9 Water Accumulation Hazards. Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. If water is controlled or prevented from accumulating by the use of water removal equipment, the process shall be monitored by a competent person to ensure proper operation.

If the excavation work interrupts the natural drainage of surface water (streams, run-off channels), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to run-off from heavy rains shall be regularly inspected by a competent person.

5.2.10 Stability of Adjacent Structures. Structures adjoining an excavation shall be evaluated to assess their stability. Excavation below the level of the base or footing of any foundation or retaining wall that could reasonably be expected to pose a hazard to employees shall only be permitted when:

- A support system (underpinning) is provided to ensure the safety of employees and the stability of the structure;
- The excavation is in stable rock;
- A registered professional engineer has determined that the structure will be unaffected by the excavation; or
- A registered professional engineer has determined that such excavation will not pose a hazard to employees.



Sidewalks, pavements and other surface structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

5.2.11 Protection from Loose Rock or Soil. Employees shall be protected from loose rock or soil which could fall or roll from the excavation face or edge. Such protection could consist of scaling to remove loose materials, or the installation of protective barriers. All spoil shall be placed at least 2 feet from the edge of the excavation. It is strongly recommended that spoil be placed 4 or more feet from the excavation edge so as not to cover surface indicators of subsidence (such as fissures or cracks).

5.2.12 Inspections. The competent person shall make daily inspections of excavations, adjacent areas, and protective systems for evidence of conditions that could result in a cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. The inspection shall be made prior to start of work, and as needed throughout the shift. Inspections shall be made after each rainstorm or other hazard-increasing event and will be documented using Attachment (2).

Where the inspection finds evidence of any hazardous condition, exposed employees shall be immediately removed from the hazardous area until necessary precautions have been taken.

5.2.13 Fall Protection. Where employees or equipment are permitted to cross over excavations, walkways or bridges shall be provided. Standard guardrails shall be provided where walkways are 6 feet or more above lower levels.

Adequate barriers or other types of physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc., shall be barricaded or covered and shall be backfilled as soon as possible.

6.0 EXCEPTION PROVISIONS

Variances and exceptions may be requested pursuant to the provisions of procedure HS013, Health and Safety Procedure Variances.



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7.0 CROSS REFERENCES

HS013 Health and Safety Procedure Variances
HS050 Training Requirements
HS051 Tailgate Safety Meetings
HS300 Confined Spaces
29 CFR 1926 Subpart P - Excavations

8.0 ATTACHMENTS

1. Responsibility Matrix
2. Excavation Inspection
3. Soil Classification Worksheet
4. Selection of Protective Systems for Excavations 20 Feet or Less in Depth
5. Sloping Options
6. Shoring or Shielding Options

ATTACHMENT 1 EXCAVATION AND TRENCHING

Responsibility Matrix

Action	Procedure Section	Responsible Party					
		Employee	Supervisor	Registered Professional Engineer	VP Health and Safety	Local H&S Representative	Competent Person
Incorporate state, local, or client-specific excavation requirements into project plans.	1.0					X	
Issue, revise, and maintain procedure	3.1				X		
Coordinate identification of underground utilities.	5.1.1		X				
Determine need for traffic control devices.	5.1.3		X				
Participate in excavation training.	5.1.4	X	X			X	X
Ensure that protective systems are installed and maintained.	5.2.1						X
Classify Soil Type	5.2.3						X
Design Structural Ramps	5.2.4						X
Selection and design of protective system(s)	5.2.5			X			
Determine stability of adjacent structures.	5.2.10			X			
Inspecting excavation for hazardous conditions	5.2.12	X	X				X



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**ATTACHMENT 2
EXCAVATION INSPECTION**

**THIS INSPECTION IS TO BE COMPLETED BY THE COMPETENT PERSON
EACH DAY THAT EMPLOYEES WILL BE ENTERING AN EXCAVATION.**

Project Name: _____ Project No.: _____

Date: _____ Time: _____ Competent Person: _____

Soil Classification (see Soil Classification Worksheet): _____

Excavation Depth: _____ Excavation Width: _____

Type of Protective System Used: _____

		YES	NO	N/A
1. GENERAL:				
Surface encumbrances removed or supported				
Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation.				
Hard hats, steel-toed boots, and safety glasses worn by all employees.				
Spoils, materials, and equipment set back at least 2 feet from the edge of the excavation.				
Walkways over excavations 6 feet or more above lower levels are equipped with standard guardrails.				
Warning vest or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic.				
Employees required to stand away from vehicles being loaded or unloaded.				
Warning system established and utilized when mobile equipment is operating near excavation edge.				
Employees prohibited from going under suspended loads.				
2. UTILITIES:				
Utility companies contacted and/or utility locations delineated.				
Underground installations protected, supported, or removed while excavation is open.				
3. MEANS OF ACCESS AND EGRESS:				
Lateral travel to means of egress no greater than 25 feet in trench excavations 4 feet or more in depth.				
Ladders used in excavations secured and extended 3 feet above the edge of the trench.				
Structural ramps used by employees designed by a competent person.				
Structural ramps used for equipment designed by a registered professional engineer.				

	YES	NO	N/A
4. WET CONDITIONS:			
Precautions taken to protect from the accumulation of water.			
Water removal equipment monitored by a competent person.			
Surface water or runoff diverted or controlled to prevent accumulation in the excavation.			
Inspections made after every rainstorm or other hazard-increasing occurrence.			
5. HAZARDOUS ATMOSPHERE:			
Atmosphere within the excavation tested where there is a reasonable possibility of an oxygen deficient, combustible, or otherwise hazardous atmosphere.			
Adequate precautions taken to protect employee from exposure to a hazardous atmosphere.			
Testing conducted to ensure that the atmosphere remains safe.			
Emergency equipment, such as breathing apparatus, safety harness and line, and basket stretcher readily available where hazardous atmosphere does exist.			
6. SUPPORT SYSTEMS:			
Materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads.			
Materials and equipment used for protective systems inspected and in good condition.			
Damaged materials and equipment used for protective systems inspected by a Registered Professional Engineer after repairs and before being placed back into service.			
Protective systems installed without exposing employees to the hazards of cave-ins, collapses, or from being struck by materials or equipment.			
Members of support systems securely fastened to prevent failure.			
Support systems provided to insure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.			
Excavations below the level of the base or footings approved by a registered professional engineer.			
Removal of support systems progresses from the bottom, and members are released slowly as to note any indication of possible failure.			
Excavation of material to a level of greater than 2 feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth.			
Shield system placed to prevent lateral movement.			
Employees are prohibited from remaining in shield system during vertical movement.			
7. REMARKS:			

ATTACHMENT 3 SOILS CLASSIFICATION WORKSHEET

The following worksheet outlines the visual and manual tests that the competent person must perform at least once, and each time soil conditions change. At least one visual and one manual test must be performed; however, performing several tests is recommended so that the condition of the excavation is thoroughly examined.

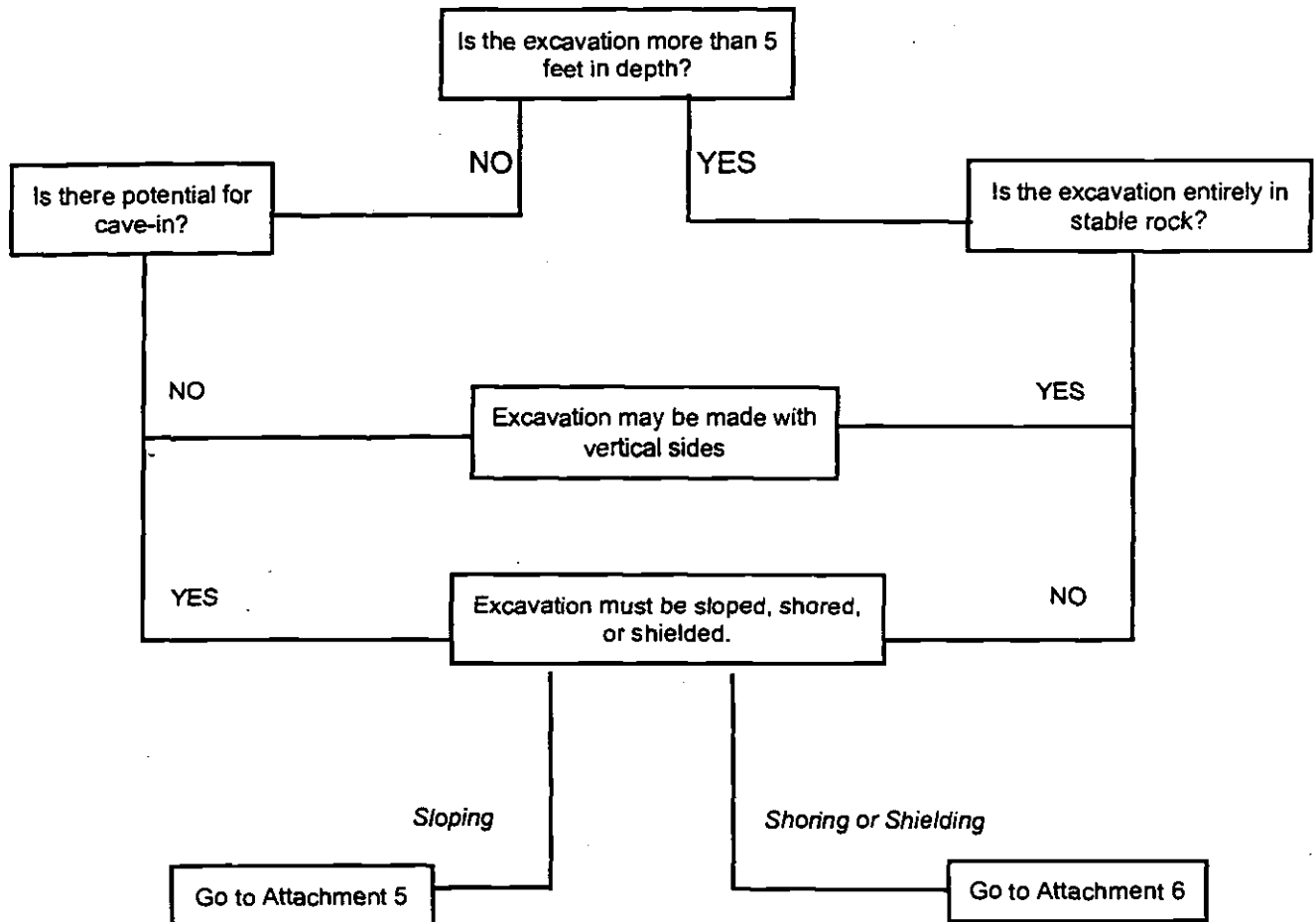
Project Name: _____ Project Number: _____

Date: _____ Time: _____

Where was the sample taken from? _____

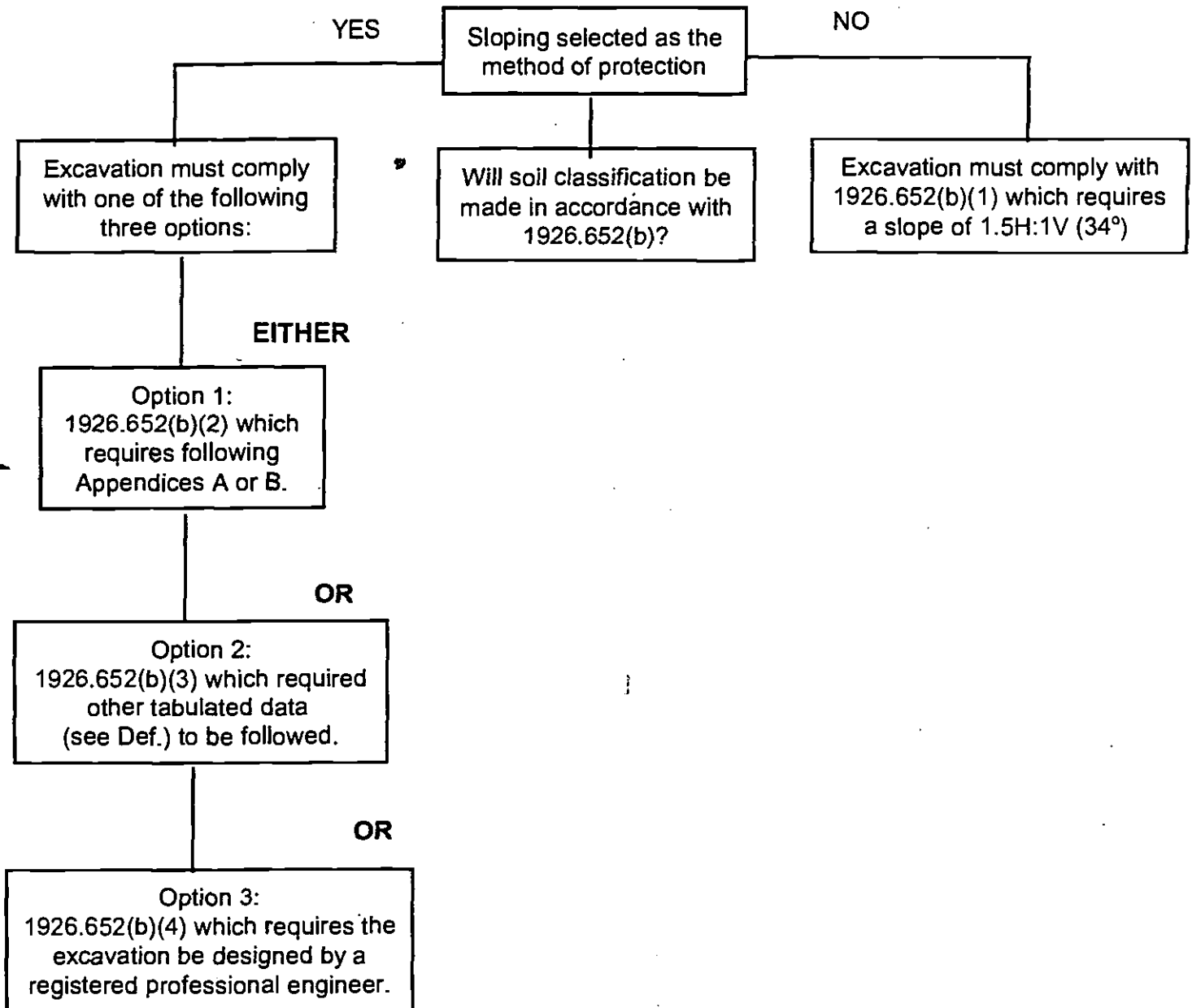
I. VISUAL TESTS: One or more visual tests are required for each classification and each time conditions change.			
1. Estimate range of particle sizes:	a. primarily fine-grained = cohesive material b. primarily coarse-grained = granular material		
2. Observe excavated soil:	a. clumps = cohesive material b. breaks up easily = granular material		
3. Observe sides and adjacent surface area of opened excavation:	a. crack like openings = fissured material b. soil spalls off vertical sides = possible fissured material		
4. Previous excavation activities:	a. previously disturbed soil	b. not previously disturbed soil	
5. Observe opened side of excavation:	a. layered systems c. estimate degree of slope of layers:	b. layers sloped towards excavation	
6. Water condition:	a. evidence of surface water c. depth of water table :	b. water seeping from sides	
7. Vibration present:	a. area adjacent to excavation	b. area within excavation	
II. MANUAL TESTS- One or more manual tests are required for classification and each time soil conditions change..			
1. Plastically- soil is cohesive if following is true:	a. mold soil samples into a small ball b. roll ball into thread 1/4" diameter c. pick up 2" length of 1/4" thread by one end without breaking		
2. Dry Soil Strength:	a. crumbles on its own or with moderate pressure = granular b. falls into clumps which break into smaller clumps that are only broken with difficulty = clay with gravel, sand, or silt. c. breaks into clumps which do not break into smaller clumps and can only be broken with difficulty with no visual indication of fissures = unfissured.		
3. Thumb penetration test: (These tests are to be run on a large clump of material as soon as it is excavated.)	a. can be easily indented by the thumb but penetrated by thumb only with great effort = Type A b. easily penetrated several inches by thumb and molded by light finger pressure = Type C		
4. Unconfined Compressive Strength: (Saturated Soil Needed)	a. Pocket Penetrometer reading (take 10 readings and average) 0 - 0.5 = Type C. 0.5 - 1.5 = Type B. 1.5 - 2.0 = Type A b. Shear Vane reading X2: 0 - 0.5 = Type C. 0.5 - 1.5 = Type B. 1.5 - 2.0 = Type A		
5. Drying Test: (A dry soil sample 1" thick X 6" diameter is needed)	a. develops cracks = fissured material b. dries without cracks and breaks by hand with considerable force significant cohesive content = unfissured cohesive material. c. sample breaks easily by hand = fissured cohesive or granular material d. easily pulverize dry clumps by hand or by stepping on them = granular e. don't pulverize easily = fissured cohesive.		
SOIL CLASSIFICATION: Type A Type B Type C Stable Rock Other _____			
COMPETENT PERSON: _____ Print Name Signature Date			

ATTACHMENT 4
SELECTION OF PROTECTIVE SYSTEMS FOR EXCAVATIONS 20 FEET OR LESS IN DEPTH

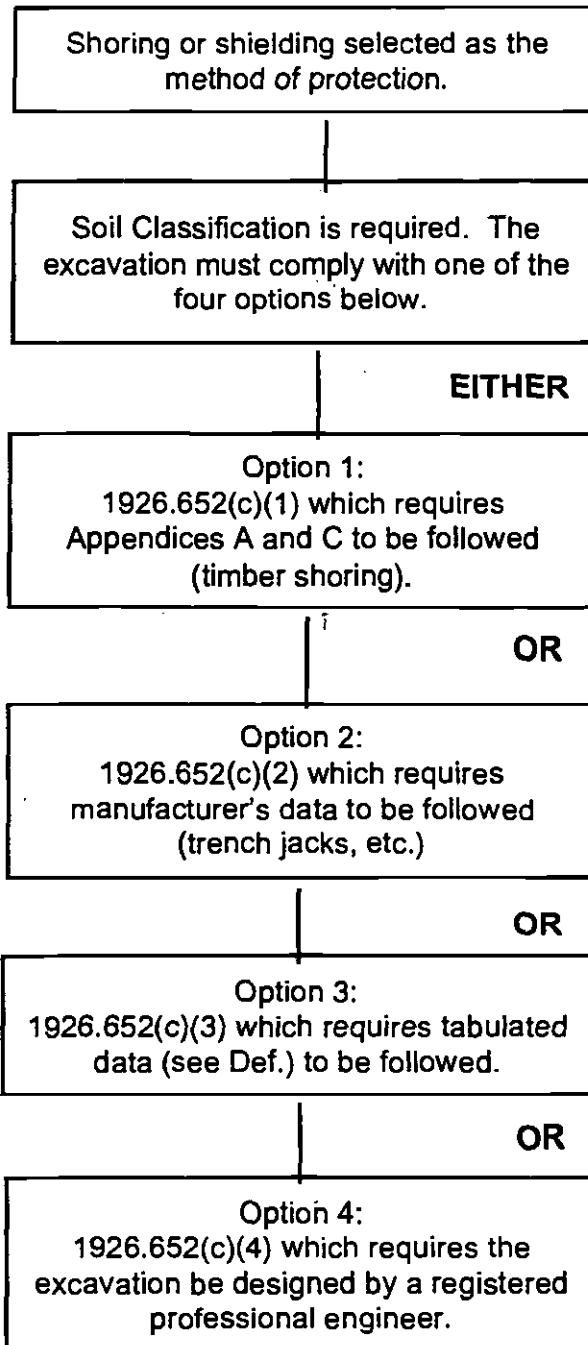


For excavations greater than 20 feet in depth, design by a registered professional engineer in compliance with 1926.652 (b) and (c) is required.

**ATTACHMENT 5
SLOPING OPTIONS**



**ATTACHMENT 6
SHORING OR SHIELDING OPTIONS**



PROCEDURE

Subject: PRESSURIZED WATER CLEANING AND CUTTING EQUIPMENT

1.0 PURPOSE AND SUMMARY

This procedure covers the personnel requirements, operator training, operating procedures, and recommended equipment performance/design for the proper operation of all types of pressure water jet cleaning and cutting equipment as normally used by industries concerned with construction, maintenance, repair, cleaning, cutting, and demolition work.

The term "high-pressure water jetting" covers all water jetting operations, including the use of additives or abrasives at pressures above 1000 psig.

Any person required to operate or maintain pressure water jetting equipment shall have been trained and have demonstrated the ability and knowledge to do so in accordance with the original equipment manufacturer's instructions, specifications, and training programs.

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5.1	Qualified Operators
5.2	Training
5.3	Personal Protective Equipment
5.4	Pre-operating Procedures
5.5	Operational Procedures
5.6	Single Person Operation
5.7	Shotgunning
5.8	Moleing or Flex Lancing
5.9	Ridge Lancing
5.10	Additives
5.11	Proper Operation
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3.0 RESPONSIBILITY MATRIX

3.1 Procedure Responsibility

The National Director, Health & Safety is responsible for the issuance, revision, and maintenance of this procedure.

3.2 Action/Approval Responsibilities

The Responsibility Matrix is Attachment 1.

4.0 DEFINITIONS

Dump System

The discharge orifice operator-controlled, manually operated device or system that reduces the pressure to a level that yields a pressure flow at the nozzle that is considerably below the risk threshold.

High-Pressure Water Cleaning

The use of high-pressure water, with or without the addition of other liquids or solid particles, to remove unwanted matter from various surfaces, where the pressure of the liquid jet exceeds 1000 psig at the orifice.

Warning: The limit of 1000 psig does not mean that pressures below 1000 psig cannot cause injury or require any less attention to the principles of this practice. Adequate precautions, similar to those of this practice, are required at all pressures.

High-Pressure Water Cutting

The use of high-pressure water, with or without the addition of other liquids or solid particles, to penetrate into the surface of a material for the purpose of cutting that material, where the pressure of the liquid jet exceeds 1000 psig at the orifice.

Hose Assembly

A hose with safety coupling attached in accordance with manufacturer's specifications.

Lance

A rigid metal tube used to extend the nozzle from the end of the hose.

Lancing

An application whereby a lance and nozzle combination is inserted into, and retracted from, the interior of a pipe or tubular product.

Moleing

An application whereby a hose fitted either with a nozzle or with a nozzle attached to a lance is inserted into, and retracted from, the interior of a tubular product. It is a system commonly intended for cleaning the internal surfaces of tubes, pipes, or drains. It can be self-propelled by

its backward-directed jets and is manufactured in various shapes, sizes, and combinations of forward- and backward-directed jets.

Nozzle

A device with one or more openings where the fluid discharges from the system. The nozzle restricts the area of flow of the fluid, accelerating the water to the required velocity and shaping it to the required flow pattern and distribution for a particular application. Combinations of forward and backward nozzles are often used to balance the thrust. Such nozzles are commonly referred to as tips, jets, orifices, etc.

Operator

A person who has been trained in accordance with the original manufacturer's instructional training program and has been qualified through demonstrating the knowledge, experience, and ability to perform the assigned task.

Operator Trainee

A person not fully qualified due to the lack of sufficient knowledge or experience, or both, to perform the assigned task without supervision.

Pressure Water Jet System

Water delivery systems that have nozzles or other openings whose function is to increase the speed of liquids that may cause injury. Solid particles or additional chemicals may also be introduced, but the exit in all cases will be in a free stream. The system shall include the pumps (pressure-producing devices), hoses, lances, nozzles, valves, safety devices, and personal protective equipment, as well as any heating elements or injection systems, attached thereto.

Shotgunning

An application whereby a lance or nozzle combination can be manipulated in virtually all planes of operation.

5.0 TEXT

This procedure is intended to provide guidance on the proper operation of pressure water jet cleaning and cutting equipment.

This procedure is also applicable at lower pressures at which there is foreseeable risk of injury.

All equipment shall be operated in a manner consistent with the manufacturer instructions for the specific model of equipment to be used. Such instructions and manuals shall be kept in a water-proof compartment with the equipment. (NOTE: Rental equipment shall not be accepted without the manufacturer's manual.)

5.1 Qualified Operators

Only personnel who have undergone a proper training program and who have demonstrated the knowledge and skill, and gained the experience to perform all likely

assigned tasks shall operate water jetting equipment. They may also supervise the training of new operators.

5.2 Training

Before being assigned to their first water jetting jobs, associates shall receive proper training. A core module for pressurized water systems is available from the Training Department. This shall be supplemented with site-specific, hands-on training per the manufacturer's instructions for the specific equipment in use. Training shall cover the following topics.

5.2.1 Cutting Action. The cutting action of a water jet and the potential hazard it poses to the human body shall be demonstrated through the use of audiovisual aids or actual use of equipment (by cutting through a piece of lumber, a concrete block, etc.).

5.2.2 System Operation. The operation of water jetting systems shall be explained by pointing out potential problems and proper corrective actions.

5.2.3 Operating Pressure. The need to operate equipment at or below the manufacturer's recommended working pressure shall be stressed.

5.2.4 Control Devices. The operation of all control devices shall be explained. The importance of not tampering with any control devices, as well as the importance of keeping them in proper working order, shall be stressed.

5.2.5 Equipment Maintenance. The importance of the proper and timely care and maintenance of water jetting equipment shall be presented. Instructions shall be provided on the procedures to follow in maintaining equipment and when the equipment must be returned for care by more qualified associates.

Stress that equipment shall not be repaired, or connections tightened, when the unit is in operation or the pump is running.

5.2.6 Valve Maintenance. Point out that valves and seating surfaces in pressure regulating devices encounter high wear during water jetting. These items require frequent inspections, maintenance, and/or replacement to ensure proper operation.

5.2.7 Hose. The proper method of identifying and connecting hoses, including laying out without kinks, protecting hoses from excessive wear, identifying a worn or unsafe hose, and proper tools to use on couplings and fittings shall be explained. Fittings and couplings on hoses shall not be tightened or tampered with while the hose is pressurized. Safety connectors (whipchecks) should be used across all hose connections.

5.2.8 Stance. The proper stance for sound footing and how to use the various devices for lancing, shotgunning, and moleing shall be demonstrated. The trainee, under close supervision, shall be trained to use the various devices while the unit is slowly pressurized and is operating at its normal working capacity.

5.2.9 Proficiency. Personnel shall demonstrate knowledge and skill in the proper operation of equipment through practical applications before performing indirectly supervised work.

5.3 Personal Protective Equipment

The minimum personal protective equipment (PPE) shall be explained. Instructions shall be given as to when and how specific clothing and other types of protective devices shall be worn according to the type of work performed, locations, etc.

5.3.1 Compliance. All applicable recommended practices and regulations, instructions, and warnings covering PPE shall be followed as prescribed by the original equipment manufacturer's programmed instructional material.

5.3.2 Head Protection. All operators shall wear hard hats with attached face shields.

5.3.3 Eye Protection. Suitable eye protection (adequate for the purpose and of adequate fit on the person) shall be provided to all operators of pressure water jetting equipment and must be worn within the working area. Where liquids liable to cause eye damage (see Material Safety Data Sheets) are encountered, it is necessary to use either a combination of visor and impact-resistant goggles, or a full hood with shield.

5.3.4 Body Protection. All operators shall be supplied with suitable waterproof clothing and jet-resistant PPE (i.e., foot and leg guards) having application for the type of work being undertaken. Garments shall provide full protective cover to the operator, including arms. Liquid- or chemical-resistant suits shall be worn where there is a reasonable probability of injury (see Material Safety Data Sheets) that can be prevented by such equipment.

5.3.5 Hand Protection. Adequate hand protection shall be supplied to all operators and shall be worn when there is a reasonable probability of injury that can be prevented by such equipment. (See original equipment manufacturer specifications.)

5.3.6 Foot and Leg Protection. All operators shall be supplied with waterproof boots with steel toecaps and shanks. Metatarsal guards and leg guards shall be used by the jetting gun operators.

5.3.7 Hearing Protection. Pressure water jetting operations may produce noise levels in excess of 90 dB(A). Suitable ear protection issued in accordance with the recommended practices of the original equipment manufacturer must be worn. Provision shall be made for regular inspection and maintenance, including daily cleaning of hearing protection devices that are of the reusable type. All personnel and operators shall receive instruction in the correct use of ear protectors such that noise exposure lies within the limits as specified by the original equipment manufacturer's instructions.

5.3.8 Respiratory Protection. A respiratory protection program shall be implemented where there is a reasonable probability of injury that can be prevented by such a program.

5.3.9 Equipment Limitations. It should be recognized that some protective equipment may not necessarily protect the operator from injury by direct high-pressure water jet impact. Shields and guards shall be used as provided in the original equipment operator's instructions and training programs to prevent any injury.

5.4 Pre-operating Procedures

5.4.1 Planning. Preplan each job. Follow the steps outlined in the original manufacturer's instructions and programmed training materials. Personnel familiar with the item to be cleaned, the material to be cut, and the work environment shall meet with the personnel that will be performing the work and outline potential hazards of the work area, environmental problems, safety standards, and emergency aid procedures.

5.4.2 Checklist. Use the manufacturer's checklist, or listing of critical items, to ensure that the proper equipment selection is followed (see Attachment 2).

5.4.3 Dump Valve. All systems shall incorporate at least one fluid shut-off or dump device. The orifice operator must always be able to shut down the water jet by releasing pressure on the trigger, switch, or foot valve pedal.

5.4.4 Warning Barriers. Erect suitable barriers to encompass the hazard area and post signs to warn personnel they are entering a hazardous area. The perimeter should be outside the effective range of the jet wherever possible. Barriers may be of rope, safety tape, barrels, etc., as long as they give an effective warning and are highly visible.

5.4.5 Hook-ups. Hose shall be arranged so that a tripping hazard does not occur. Support hoses, pipes, and fittings to prevent excessive sway or wear, or both, created by vibration or stress on the end connections when laid on the ground,

over sharp objects or on vertical runs, shall be used. Check all hoses for evidence of damage, wear, or imperfections. The check shall be made periodically during the operation.

5.4.5.1 Fittings. Clean and lubricate all fittings before installing in the system. Be sure all fittings, hoses, and nozzles are fit for the purpose.

5.4.5.2 Pre-flushing. Flush the system completely with sufficient water to remove any contaminants before installing the nozzle.

5.4.5.3 Nozzles. Remove nozzles and check all orifices for any blockage or damage, or both, or for imperfections.

5.4.5.4 Electrical Equipment. Any electrical equipment in the immediate area of the operation that presents a hazard to the operator shall be de-energized, shielded, or otherwise made safe. GFCIs shall be used for any necessary power hook-ups.

5.5 Operational Procedures

5.5.1 Work Area. Isolate the workpieces/items to be jetted from any unprotected areas to a protected pressure water jetting area. Cutting or cleaning in place or adjacent to the installed position can be done with the necessary clearance and permission of the occupier and equipment/facility owner.

5.5.2 Area Limits. Area limits applicable to the cutting or cleaning operations shall be defined by barriers and should be marked with notices to warn against access to other personnel and specific hazards present. Suitable barriers shall be an approved form of hazard warning, rope, or tape, as a minimum. Alternatively, a suitable barrier shield is acceptable at any reasonable distance. Notices should read "Danger - Keep Clear, Pressure Water Jetting in Operation - Severe Injury May Result", or other suitable wording.

5.5.3 Corrosive Materials. Where there is a possibility of encountering corrosive or toxic material, the general contractor or employer or owner shall be requested to inform the person in charge of pressure water jetting of any precautions that may be necessary, including the collection and disposal of waste materials.

5.5.4 Work Surface. Operators should have good access to the workpiece, safe walking and working surfaces, and secure footing. The work area should be kept clear of loose items and debris to prevent tripping and slipping hazards.

5.5.5 Unauthorized Access. Prevent access by unauthorized persons into the area where pressure water jet cleaning or cutting, or both, is taking place. The area

shall be secured as described in Section 5.5.2. The perimeter should be outside the effective range of the jet wherever possible.

- 5.5.6 Approaching the Operator.** Personnel having reasons to enter the pressure water jet cleaning and cutting area must wait until the jet is stopped and their presence is known. Personnel wishing to have the jet stopped shall approach a team member other than the jet operator. The jet operator shall not be distracted until the jet has been stopped.
- 5.5.7 Side Protection.** Suitably placed side shields shall be provided to safeguard personnel and equipment against contact with grit or solids removed by the jet.
- 5.5.8 Pressurizing the System.** Increase pressure slowly on the system while it is being inspected for leaks or faulty components, or both. Repair or replace components only when the equipment is properly locked out and tagged. The system shall be depressurized, shut down, and the key removed for repairs.
- 5.5.9 Team Operations.** In jetting operations a minimum of two persons, one at the pump and one at the orifice or gun, shall be employed at all times.
- 5.5.10 Supervision.** All pressure water jetting operations shall be controlled by a supervisor who has been trained in accordance with the instructions of the original equipment manufacturer in all aspects of the jetting operation.
- 5.5.11 Number of Operators.** The operators of the pressure water jetting equipment should consist of two or more operators according to the equipment being used and the nature of the job. These operators shall work as a team, with one member designated in charge. The operator of the gun or lance shall take the lead role while jetting is in progress.
- 5.5.12 Gun Operator.** One operator from the team shall hold the lance, gun, or delivery hose with the nozzle mounted on it. That operator's primary duty is to direct the jet.
- 5.5.13 Second Operator.** The second operator of the team shall attend the pump unit, keep close watch on the first operator for signs of difficulty or fatigue, and watch the surrounding area for intrusion by other persons or unsafe situations. If required, the operator will shut off the pressure until any unsafe acts or conditions have been corrected and it is safe to continue.

Warning: Exercise caution in shutting off the pressure rapidly, as this can cause loss of footing by the gun operator.

5.5.14 Additional Operators. Additional operators are required in the following circumstances:

- To assist the first operator with the handling of the lance if it is too long or too heavy for one person; or
- To provide communication if the lance operator is out of sight of the pump unit operator.

5.5.15 Job Rotation. The team members should rotate their duties during any job to minimize fatigue to the operator holding the lance or gun.

5.5.16 Team Leader. The team leader is responsible for basic equipment checks, the preparation of the working area for safe operation, and for obtaining a permit to work (if applicable).

5.5.17 Code of Signals. Before starting a jetting operation, the team members, one of whom must be in charge, shall agree on signals to be used during the operation of the equipment.

5.5.18 Fitness. The operator and other team members shall be capable of performing the required operations safely. All shall be capable of speaking and reading the instructions and warnings in the language of their place of work.

5.6 Single Person Operation

Single person operation is allowed where the pressure does not constitute a hazard to personnel. Single person operations are prohibited at operating pressures exceeding 1000 psig and may be deemed unsafe at lower pressures due to jobsite conditions.

(NOTE: All HAZWOPER operations are required to use the buddy system.)

5.6.1 Single Operator Guidelines. All other recommendations pertaining to team operations shall apply.

5.7 Shotgunning

5.7.1 Controls. The person operating the nozzle shall have direct control of the dump system.

5.7.2 Attendance. The pressurized system shall never be left unattended.

5.7.3 Multiple Operation. When more than one shotgunning operation is being performed within the same area, install a physical barrier or maintain adequate spacing between operators to prevent the possibility of injury from the pressure water.

5.7.4 Target Holding. Never manually hold objects to be cleaned.

5.7.5 Connection Protection. The point where the hose connects to the gun shall be shrouded by a protective device such as a heavy duty hose, shoulder guard, and the like, to prevent injury to the operator should the hose, pipe, or fitting rupture.

5.7.6 Minimum Length. When used, the minimum length of the shotgun lance extension shall be 4 feet (1.2 mm) from the triggering device to the nozzle.

5.7.7 Hose Protection. Use steel-braided hoses on air-operated, fail-safe systems to keep the system from being activated by someone stepping on the hose or running over it.

5.8 Moleing or Flex Lancing

5.8.1 Control. The operator shall have direct control of the dump system.

5.8.2 Reversing. A positive method shall be used to prevent the nozzle from reversing direction inside the item being cleaned. Safety guards for this purpose shall be used.

5.8.3 Retrojets. During manual operations, the entrance to a line or pipe shall not be cleaned with a nozzle containing back jets without adequate shielding.

5.8.4 Clearance. The clearance between the outside diameter of the hose, lance, and nozzle assembly and the inside wall of the item being cleaned shall be sufficient to allow adequate washout of water and debris.

5.8.5 Pressurization. During manual operation, insert the nozzle into the tube prior to pressurizing. Conversely, depressurize the system before removing the nozzle from the tube.

5.8.6 End Identification. Hoses shall be conspicuously marked no closer than 24 inches (600 mm) from the nozzle to warn the operator of the nozzle location.

5.8.7 Nozzle Support. Where the length of the nozzle and rigid coupling is less than the inside diameter of the pipe, a length of rigid pipe of not less than the diameter of the pipe being cleaned shall be fitted directly behind the nozzle, or a suitable safety shield shall be provided to protect the operator. This is to prevent the nozzle from turning around 180° and doubling back towards the operator. Specific safety guards shall be used for this purpose.

5.9 Ridge Lancing

5.9.1 Control. The operator inserting the nozzle shall have direct control of the dump system.

5.9.2 Clearance. The clearance between the outside diameter of the lance and nozzle and the inside wall of the item being cleaned shall be sufficient to allow adequate washout of water and debris.

5.9.3 Pressurization. When under manual operation the nozzle shall be inserted into the tube prior to pressurizing. Conversely, the system shall be depressurized before removal of the nozzle from the tube, unless proper shielding is provided.

5.9.4 Shields. When lancing tubes with a rigid lance, a guard shall be installed around the lance to prevent a lance nozzle from being inadvertently withdrawn and causing injury.

5.10 Additives

Any water additive (chemical, detergent, or solid particle) shall be used in accordance with the manufacturer's recommendations.

5.11 Proper Operation

5.11.1 Start-up. Do not start the pump unit and bring it up to pressure unless each team member is in his designated position, the nozzle is held in or directed at the workpiece, and the lance or gun is securely held.

5.11.2 Adjustments. Apart from operational procedures, no attempt shall be made to perform maintenance or adjust any nut, hose connection, fitting, etc., while the system is under pressure. Stop the pumps, discharge any pressure in the line, and remove the key prior to making any such adjustment. Take care to release the pressure in the dry shut-off gun and the line when the unit is switched off.

5.11.3 Equipment Malfunction. If for any reason the water flow does not shut off when the trigger or foot pedal is released, cease work until the item has been serviced, repaired, or changed by properly trained personnel. Equipment shall be shut down, depressurized, and the key removed prior to making repairs.

5.11.4 Reaction Force. The operators shall be allowed to experience the reaction force of the jet progressively until the required operating pressure is reached. Use the lowest pressure compatible with the work to be done. Do not adjust the pressure without the operator being aware of this operation.

5.11.5 Effect of Line Pulses. Operators shall be made aware of the reactive effect of pressure in the line that can transmit a severe jolt to the operator when the dump valve or dry shut-off valve is operated. To minimize this effect, keep total hose lengths as short as possible. Damping devices shall be introduced into the system in accordance with the original equipment manufacturer's designs or instructions.

5.11.6 Thermoplastic Hoses. Thermoplastic hose shall not be used for water jetting unless specifically designed for this purpose.

5.11.7 Operator Position. While operating, the team members shall be safely positioned. Stop the jetting if any person encroaches into the working area.

5.11.8 Work Stoppage. Stop work in the following cases:

- In the event that leaks or damage become apparent;
- If any person becomes aware of any change in conditions or of any hazards being introduced or existing;
- If plant or work alarms are sounded; or
- If any of the practices in this procedure are not being followed.

5.11.9 Hose Protection. Protect all hoses from being run over and crushed by vehicles, fork lift trucks, and the like.

5.11.10 Back Thrust. The back thrust from a linearly directed jet can be calculated from the equation:

$$B = 0.052 Q(P)^{0.5}$$

where:

B = Back thrust, lb(kg)

Q = Flow rate, gal/min (or metric equivalents), and

P = Jet pressure (psi)

It is not recommended that one person be required to withstand a back thrust of more than one third of his or her body weight for any extended period of time.

5.12 Use of Lances and Nozzles

5.12.1 Lances. Lances that are rigid or semirigid, having nozzles fitted to them with any combination of forward, backward, or 90° angle jets, shall be used with either a dump system or dry shut-off control valve. When a flexible lance or nozzle mounted on a hose is in use, do not operate the jet at pressure unless the nozzle is properly positioned inside the workpiece or the operator is protected by screens or proper shielding from the rear-facing jets. If necessary, clean the lead-in to the workpiece by other methods.

- 5.12.2 Flexible Lances.** Flexible lances, used to clean pipes where the inside diameter of the pipe is not small enough to prevent the lance from turning back on itself, shall have a piece of rigid straight tube, slightly longer than the diameter of the pipe, fitted immediately behind the nozzle to prevent this from happening.
- 5.12.3 Distance Indicator.** When using an assembly that allows the nozzle to enter the workpiece with restricted visibility, clearly mark the lance, hose, or floor in a manner that enables the operator to judge how far the nozzle is in the workpiece before pressure is applied and, conversely, so that pressure is released before the apparatus is completely withdrawn from the workpiece.
- 5.12.4 Lance Length.** The length of a rigid lance or combination of lances shall be such that the operator can maintain control at all times.
- 5.12.5 Jet Pressure.** Operators shall select the nozzle and minimum operating pressure to allow effective and efficient jetting.
- 5.12.6 Improper Use.** Should an operator enter a manhole or access port for any purpose (with the jetting machine turned off), the hose shall not be used to support his weight when climbing up or down.

7.0 CROSS REFERENCES

ASTM E-1575-93, *Standard Practice for Pressure Water Cleaning and Cutting*
Water Jet Technology Association's *Recommended Practices for the Use of Manually Operated High Pressure Water Jetting Equipment*

8.0 ATTACHMENTS

1. Responsibility Matrix
2. Reservice and Operational Checklist for Pressure Water Jet Cleaning and Cutting Equipment

ATTACHMENT 1
PRESSURIZED WATER CLEANING AND CUTTING EQUIPMENT

Responsibility Matrix

Action	Procedure Section	Responsible Party			
		Location Manager	Site Supervisor	Project Manager	HS
Provide training	5.2	X		X	
Job set-up/checklist	5.4.2		X	X	
Incorporate requirements in HASP	5.13			X	X



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ATTACHMENT 2 - RESERVICE & OPERATIONAL CHECKLIST FOR PRESSURE WATER JET CLEANING AND CUTTING EQUIPMENT

The following information shall be verified before starting work:

ITEM #	DESCRIPTION	✓
1.	Date (Print): _____	
2.	Location (Print): _____	
3.	Equipment being cleaned (Print): _____	
4.	Is the area, including the other end of unit being cleaned, properly secured?	
5.	Have precautions been taken to protect all electrical equipment?	
6.	Is there any hazard to personnel resulting from damage to the equipment such as release of corrosive chemicals, flammable liquids, gases, or the like?	
7.	Are all fittings of the correct pressure rating?	
8.	Are all hoses of the correct pressure rating?	
9.	Are all fittings in good operating condition?	
10.	Are all hoses in good operating condition?	
11.	Are all nozzles free from plugging and in good operating condition?	
12.	Have precautions been taken to prevent line-mole reversal?	
13.	Is the filter on the pump suction clean and in good operating condition?	
14.	Is there an adequate water supply?	
15.	Have precautions been taken against freezing?	
16.	Do all personnel have proper personal protective equipment for this job?	
17.	Do all personnel have proper training for this job?	
18.	Are all personnel qualified to perform this work?	
19.	Has the complete hook-up been flushed and air removed from the system prior to installing the nozzle?	
20.	Has hook-up, including pipes, hoses, and connections, been pressure tested with water at the maximum operating pressure?	
21.	Is the dump system operating properly (will it dump when released)?	
22.	Are all control systems operational?	
23.	Is the location of emergency medical aid known?	

These standard policies and procedures are applicable to all members of The IT Group, Inc., except where superseded or modified by the member Company.

Appendix C

Material Safety Data Sheets (MSDS)

Please reduce your browser font size for better viewing and printing.

MSDS**Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 800-859-2151
CHEMTREC: 1-800-424-8300

National Response in Canada
CANUTEC: 613-896-6066

Outside U.S. and Canada
Chemtec: 202-483-7018

NOTE: CHEMTREC, CANUTEC and National
Response Center emergency numbers to be
used only in the event of chemical emergencies
involving a spill, leak, fire, exposure or accident
involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-562-2537) for assistance.

ALCONOX(tm)

MSDS Number: A2052 — Effective Date: 12/08/96

1. Product Identification

Synonyms: Alkyl Aryl Sulfonates
CAS No.: Not applicable.
Molecular Weight: Not applicable.
Chemical Formula: Not applicable.
Product Codes: A461

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Alconox (tm)	N/A	90 - 100%	Yes

3. Hazards Identification**Emergency Overview**

WARNING! CAUSES IRRITATION.

J.T. Baker SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Orange (General Storage)

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Potential Health Effects

Inhalation:
None identified.

Ingestion:
May be harmful.

Skin Contact:
Irritation.

Eye Contact:
Irritation.

Chronic Exposure:
No information found.

Aggravation of Pre-existing Conditions:
No information found.

4. First Aid Measures

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Prompt action is essential.

Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes.

Eye Contact:
In case of eye contact, immediately flush with plenty of water for at least 15 minutes.

5. Fire Fighting Measures

Fire:
Not expected to be a fire hazard.

Explosion:
None identified.

Fire Extinguishing Media:
Use extinguishing media appropriate for surrounding fire.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Wear self-contained breathing apparatus and full protective clothing. With clean shovel, carefully place material into clean, dry container and cover; remove from area. Flush spill area with water.

7. Handling and Storage

Keep container tightly closed. Suitable for any general chemical storage area. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

None established.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

For conditions of use where exposure to the substance is apparent, consult an industrial hygienist. For emergencies, or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

White Powder.

Odor:
No information found.

Solubility:
Appreciable (>10%)

Specific Gravity:
0.00

pH:
No information found.

% Volatiles by volume @ 21C (70F):
N/A

Boiling Point:
No information found.

Melting Point:
No information found.

Vapor Density (Air=1):
Not applicable.

Vapor Pressure (mm Hg):
Not applicable.

Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
No information found.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
No information found.

Conditions to Avoid:
No information found.

11. Toxicological Information

-----\Cancer Lists\-----

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Alconox (tm)	No	No	None

12. Ecological Information

Environmental Fate:
No information found.

Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Alconox (tm)	Yes	No	No	No

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	--Canada--		Phil.
		DSL	NDSL	
Alconox (tm)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
Alconox (tm)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8 (d)
Alconox (tm)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: No information found.
Poison Schedule: No information found.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

Label Hazard Warning:

WARNING! CAUSES IRRITATION.

Label Precautions:

Keep in tightly closed container. Wash thoroughly after handling.

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse.

Product Use:

Laboratory Reagent. Research and Development Use Only.

Revision Information:

Pure. New 16 section MSDS format, all sections have been revised.

Disclaimer:

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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

*** CHEMICAL IDENTIFICATION ***

RTECS NUMBER : CI6478500
 CHEMICAL NAME : Asbestos, chrysotile
 CAS REGISTRY NUMBER : 12001-29-5
 OTHER CAS REGISTRY NOS. : 61076-97-9
 LAST UPDATED : 199712
 DATA ITEMS CITED : 83
 COMPOUND DESCRIPTOR : Tumorigen
 Mutagen
 Human
 Natural Product

SYNONYMS/TRADE NAMES :

- * 7-45 Asbestos
- * Asbestos
- * Avibest C
- * Calidria RG 100
- * Calidria RG 144
- * Calidria RG 600
- * Cassiar AK
- * Chrysotile asbestos
- * Chrysotile asbestos
- * Hooker No. 1 chrysotile asbestos
- * K6-30
- * Metaxite
- * NCI C61223A
- * Plastibest 20
- * 5R04
- * RG 600
- * Serpentine chrysotile
- * Sylodex
- * White asbestos

*** HEALTH HAZARD DATA ***

** ACUTE TOXICITY DATA **

TYPE OF TEST : TCLo - Lowest published toxic concentration
 ROUTE OF EXPOSURE : Inhalation
 SPECIES OBSERVED : Human
 DOSE/DURATION : 2.8 fb/cc/5Y
 TOXIC EFFECTS :

Lungs, Thorax, or Respiration - fibrosis, focal (pneumoconiosis)
 Lungs, Thorax, or Respiration - cough
 Lungs, Thorax, or Respiration - dyspnea

REFERENCE :

ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St.,
 Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 23,292,1980

TYPE OF TEST : LDLo - Lowest published lethal dose
 ROUTE OF EXPOSURE : Intraperitoneal
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 300 mg/kg
 TOXIC EFFECTS :

Behavioral - changes in motor activity (specific assay)
 Gastrointestinal - hypermotility, diarrhea
 Gastrointestinal - peritonitis

REFERENCE :

AJPA44 American Journal of Pathology. (Lippincott/Harper, Journal
 Fulfillment Dept., 2350 Virginia Ave., Hagerstown, MD 21740) V.1- 1925-
 Volume(issue)/page/year: 70,291,1973

** OTHER MULTIPLE DOSE TOXICITY DATA **

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TYPE OF TEST : TDLo - Lowest published toxic dose
 ROUTE OF EXPOSURE : Oral
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 10867 mg/kg/78W-C
 TOXIC EFFECTS :
 Gastrointestinal - other changes
 Kidney, Ureter, Bladder - other changes in urine composition
 Biochemical - Metabolism (Intermediary) - other carbohydrates
 REFERENCE :
 TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE
 Amsterdam, Netherlands) V.1- 1977- Volume(issue)/page/year: 39,205,1987

TYPE OF TEST : TCLo - Lowest published toxic concentration
 ROUTE OF EXPOSURE : Inhalation
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 8210 ug/m3/6H/20D-I
 TOXIC EFFECTS :
 Lungs, Thorax, or Respiration - fibrosis (interstitial)
 REFERENCE :
 TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E.
 First St., Duluth, MN 55802) V.1- 1959- Volume(issue)/page/year:
 137,67,1996

TYPE OF TEST : TCLo - Lowest published toxic concentration
 ROUTE OF EXPOSURE : Inhalation
 SPECIES OBSERVED : Rodent - hamster
 DOSE/DURATION : 30 mg/m3/6H/78W-I
 TOXIC EFFECTS :
 Lungs, Thorax, or Respiration - fibrosis (interstitial)
 Lungs, Thorax, or Respiration - changes in lung weight
 REFERENCE :
 INHTE5 Inhalation Toxicology. (Hemisphere Publishing Corp., c/o Taylor &
 Francis Inc., 1900 Frost Rd., Suite 101, Bristol, PA 19007) V.1- 1989-
 Volume(issue)/page/year: 7,503,1995

** TUMORIGENIC DATA **

TYPE OF TEST : TCLo - Lowest published toxic concentration
 ROUTE OF EXPOSURE : Inhalation
 SPECIES OBSERVED : Human - man
 DOSE/DURATION : 400 mppcf/1Y-C
 TOXIC EFFECTS :
 Tumorigenic - Carcinogenic by RTECS criteria
 Lungs, Thorax, or Respiration - fibrosis, focal (pneumoconiosis)
 Lungs, Thorax, or Respiration - tumors
 REFERENCE :
 AEHLAU Archives of Environmental Health. (Heldref Pub., 4000 Albemarle St.,
 NW, Washington, DC 20016) V.1- 1960- Volume(issue)/page/year:
 28,61,1974

TYPE OF TEST : TDLo - Lowest published toxic dose
 ROUTE OF EXPOSURE : Oral
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 7100 mg/kg/39W-C
 TOXIC EFFECTS :
 Tumorigenic - Carcinogenic by RTECS criteria
 Liver - tumors
 Kidney, Ureter, Bladder - Kidney tumors
 REFERENCE :
 ARGEAR Archiv fuer Geschwulstforschung. (VEB Verlag Volk und Gesundheit
 Neue Gruenstr. 18, Berlin DDR-1020, Ger. Dem. Rep.) V.1- 1949-
 Volume(issue)/page/year: 46,437,1976

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TYPE OF TEST : TCLo - Lowest published toxic concentration
 ROUTE OF EXPOSURE : Inhalation
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 11 mg/m3/26W-I
 TOXIC EFFECTS :

Tumorigenic - Carcinogenic by RTECS criteria
 Lungs, Thorax, or Respiration - tumors

REFERENCE :
 BJCAAI British Journal of Cancer. (Macmillan Press Ltd., Houndmills,
 Basingstoke, Hants. RG21 2XS, UK) V.1- 1947- Volume(issue)/page/year:
 29,252,1974

TYPE OF TEST : TDLo - Lowest published toxic dose
 ROUTE OF EXPOSURE : Intraperitoneal
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 9 mg/kg
 TOXIC EFFECTS :

Tumorigenic - Carcinogenic by RTECS criteria
 Tumorigenic - tumors at site of application

REFERENCE :
 ZHPMAT Zentralblatt fuer Bakteriologie, Parasitenkunde,
 Infektionskrankheiten und Hygiene, Abteilung 1: Originale, Reihe B: Hygiene,
 Krankenhaushygiene, Betriebshygiene, Praeventive Medizin. (Stuttgart, Fed.
 Rep. Ger.) V.155-169, 1971-1979. For publisher information, see ZAOMDC.
 Volume(issue)/page/year: 162,467,1976

TYPE OF TEST : TDLo - Lowest published toxic dose
 ROUTE OF EXPOSURE : Intrapleural
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 100 mg/kg
 TOXIC EFFECTS :

Tumorigenic - Carcinogenic by RTECS criteria
 Lungs, Thorax, or Respiration - tumors

REFERENCE :
 BJCAAI British Journal of Cancer. (Macmillan Press Ltd., Houndmills,
 Basingstoke, Hants. RG21 2XS, UK) V.1- 1947- Volume(issue)/page/year:
 23,567,1969

TYPE OF TEST : TDLo - Lowest published toxic dose
 ROUTE OF EXPOSURE : Intrapleural
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 300 mg/kg/12W-I
 TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria
 Lungs, Thorax, or Respiration - tumors

REFERENCE :
 VOONAW Voprosy Onkologii. Problems of Oncology. For English translation,
 see PONCAU. (V/O Mezhdunarodnaya Kniga, 113095 Moscow, USSR) V.1-10,
 1928-37; V.1- 1955- Volume(issue)/page/year: 20(4),47,1974

TYPE OF TEST : TDLo - Lowest published toxic dose
 ROUTE OF EXPOSURE : Intratracheal
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 13 mg/kg
 TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria
 Lungs, Thorax, or Respiration - bronchiogenic carcinoma

REFERENCE :
 ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St.,
 Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 21,63,1980

TYPE OF TEST : TDLo - Lowest published toxic dose
 ROUTE OF EXPOSURE : Implant
 SPECIES OBSERVED : Rodent - rat

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DOSE/DURATION : 200 mg/kg

TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria

Tumorigenic - tumors at site of application

REFERENCE :

IARCCD IARC Scientific Publications. (Geneva, Switzerland) No.1-26, 1971-78. For publisher information, see IAPUDO. Volume(issue)/page/year: 8,289,1973

TYPE OF TEST : TDLo - Lowest published toxic dose

ROUTE OF EXPOSURE : Intraperitoneal

SPECIES OBSERVED : Rodent - mouse

DOSE/DURATION : 80 mg/kg

TOXIC EFFECTS :

Tumorigenic - Carcinogenic by RTECS criteria

Tumorigenic - tumors at site of application

REFERENCE :

ENVRAI Environmental Research. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 35,277,1984

TYPE OF TEST : TDLo - Lowest published toxic dose

ROUTE OF EXPOSURE : Subcutaneous

SPECIES OBSERVED : Rodent - mouse

DOSE/DURATION : 2400 mg/kg/13W-I

TOXIC EFFECTS :

Tumorigenic - neoplastic by RTECS criteria

Lungs, Thorax, or Respiration - tumors

Tumorigenic - tumors at site of application

REFERENCE :

FCTXAV Food and Cosmetics Toxicology. (London, UK) V.1-19, 1963-81. For publisher information, see FCTOD7. Volume(issue)/page/year: 6,566,1968

TYPE OF TEST : TDLo - Lowest published toxic dose

ROUTE OF EXPOSURE : Intratracheal

SPECIES OBSERVED : Rodent - mouse

DOSE/DURATION : 200 mg/kg

TOXIC EFFECTS :

Tumorigenic - Carcinogenic by RTECS criteria

Lungs, Thorax, or Respiration - tumors

REFERENCE :

PAACA3 Proceedings of the American Association for Cancer Research. (Waverly Press, 428 E. Preston St., Baltimore, MD 21202) V.1- 1954- Volume(issue)/page/year: 15,6,1974

TYPE OF TEST : TDLo - Lowest published toxic dose

ROUTE OF EXPOSURE : Intraperitoneal

SPECIES OBSERVED : Rodent - rabbit

DOSE/DURATION : 25 mg/kg

TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria

Gastrointestinal - other changes

REFERENCE :

IAPUDO IARC Publications. (WHO Publications Centre USA, 49 Sheridan Ave., Albany, NY 12210) No.27- 1979- Volume(issue)/page/year: 30,337,1980

TYPE OF TEST : TCLo - Lowest published toxic concentration

ROUTE OF EXPOSURE : Inhalation

SPECIES OBSERVED : Rodent - hamster

DOSE/DURATION : 23 mg/m3/7H/47W-I

TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria

Lungs, Thorax, or Respiration - tumors

Endocrine - adrenal cortex tumors

REFERENCE :

ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St.,
Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 10,368,1975

TYPE OF TEST : TDLo - Lowest published toxic dose
ROUTE OF EXPOSURE : Intraperitoneal
SPECIES OBSERVED : Rodent - hamster
DOSE/DURATION : 200 mg/kg
TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria
Gastrointestinal - other changes

REFERENCE :
IAPUDO IARC Publications. (WHO Publications Centre USA, 49 Sheridan Ave.,
Albany, NY 12210) No.27- 1979- Volume(issue)/page/year: 30,337,1980

TYPE OF TEST : TDLo - Lowest published toxic dose
ROUTE OF EXPOSURE : Multiple routes
SPECIES OBSERVED : Rodent - hamster
DOSE/DURATION : 240 gm/kg/35W-C
TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria
Tumorigenic - facilitates action of known carcinogen

REFERENCE :
ANYAA9 Annals of the New York Academy of Sciences. (New York Academy of
Sciences, 2 E. 63rd St., New York, NY 10021) V.1- 1877-
Volume(issue)/page/year: 132,456,1965

TYPE OF TEST : TD - Toxic dose (other than lowest)
ROUTE OF EXPOSURE : Intrapleural
SPECIES OBSERVED : Rodent - rat
DOSE/DURATION : 90 mg/kg
TOXIC EFFECTS :

Tumorigenic - neoplastic by RTECS criteria
Tumorigenic - tumors at site of application

REFERENCE :
JSOMBS Journal of the Society of Occupational Medicine. (John Wright &
Sons, Ltd., Techno House, Redcliffe Way, Bristol BS1 6NX, UK) V.23- 1973-
Volume(issue)/page/year: 29,20,1979

TYPE OF TEST : TD - Toxic dose (other than lowest)
ROUTE OF EXPOSURE : Intraperitoneal
SPECIES OBSERVED : Rodent - rat
DOSE/DURATION : 90 mg/kg
TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria
Tumorigenic - tumors at site of application

REFERENCE :
ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St.,
Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 4,496,1971

TYPE OF TEST : TC - Toxic concentration (other than lowest)
ROUTE OF EXPOSURE : Inhalation
SPECIES OBSERVED : Rodent - rat
DOSE/DURATION : 12 mg/m3/13W-I
TOXIC EFFECTS :

Tumorigenic - neoplastic by RTECS criteria
Lungs, Thorax, or Respiration - tumors

REFERENCE :
RRCRBU Recent Results in Cancer Research. (Springer-Verlag New York, Inc.,
Service Center, 44 Hartz Way, Secaucus, NJ 07094) V.1- 1965-
Volume(issue)/page/year: 39,37,1972

TYPE OF TEST : TD - Toxic dose (other than lowest)
ROUTE OF EXPOSURE : Intraperitoneal
SPECIES OBSERVED : Rodent - rat

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DOSE/DURATION : 28 mg/kg

TOXIC EFFECTS :

Tumorigenic - neoplastic by RTECS criteria
 Gastrointestinal - tumors

REFERENCE :

NATWAY Naturwissenschaften. (Springer-Verlag, Heidelberger Platz 3, D-1000
 Berlin 33, Fed. Rep. Ger.) V.1- 1913- Volume(issue)/page/year:
 59,318,1972

TYPE OF TEST : TD - Toxic dose (other than lowest)

ROUTE OF EXPOSURE : Intrapleural

SPECIES OBSERVED : Rodent - rat

DOSE/DURATION : 200 mg/kg

TOXIC EFFECTS :

Tumorigenic - neoplastic by RTECS criteria
 Lungs, Thorax, or Respiration - bronchiogenic carcinoma

REFERENCE :

JNCIAM Journal of the National Cancer Institute. (Washington, DC) V.1-60,
 1940-78. For publisher information, see JJIND8. Volume(issue)/page/year:
 48,797,1972

TYPE OF TEST : TC - Toxic concentration (other than lowest)

ROUTE OF EXPOSURE : Inhalation

SPECIES OBSERVED : Rodent - rat

DOSE/DURATION : 10 mg/m3/52W-C

TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria
 Lungs, Thorax, or Respiration - tumors

REFERENCE :

IAPUDO IARC Publications. (WHO Publications Centre USA, 49 Sheridan Ave.,
 Albany, NY 12210) No.27- 1979- Volume(issue)/page/year: 30,285,1980

TYPE OF TEST : TC - Toxic concentration (other than lowest)

ROUTE OF EXPOSURE : Inhalation

SPECIES OBSERVED : Rodent - rat

DOSE/DURATION : 11 mg/m3/8H/26W-I

TOXIC EFFECTS :

Tumorigenic - Carcinogenic by RTECS criteria
 Lungs, Thorax, or Respiration - tumors

REFERENCE :

IAPUDO IARC Publications. (WHO Publications Centre USA, 49 Sheridan Ave.,
 Albany, NY 12210) No.27- 1979- Volume(issue)/page/year: 30,363,1980

TYPE OF TEST : TD - Toxic dose (other than lowest)

ROUTE OF EXPOSURE : Intratracheal

SPECIES OBSERVED : Rodent - hamster

DOSE/DURATION : 48 mg/kg/6W-I

TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria
 Lungs, Thorax, or Respiration - tumors

REFERENCE :

IAPUDO IARC Publications. (WHO Publications Centre USA, 49 Sheridan Ave.,
 Albany, NY 12210) No.27- 1979- Volume(issue)/page/year: 30,305,1980

TYPE OF TEST : TD - Toxic dose (other than lowest)

ROUTE OF EXPOSURE : Intraperitoneal

SPECIES OBSERVED : Rodent - mouse

DOSE/DURATION : 400 mg/kg

TOXIC EFFECTS :

Tumorigenic - equivocal tumorigenic agent by RTECS criteria
 Gastrointestinal - tumors

REFERENCE :

ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St.,
 Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 27,433,1982

TYPE OF TEST : TD - Toxic dose (other than lowest)
 ROUTE OF EXPOSURE : Intrapleural
 SPECIES OBSERVED : Rodent - rat
 DOSE/DURATION : 120 mg/kg/2W-I

TOXIC EFFECTS :
 Tumorigenic - neoplastic by RTECS criteria
 Tumorigenic - tumors at site of application

REFERENCE :
 CALEDQ Cancer Letters (Shannon, Ireland). (Elsevier Scientific Pub. Ireland Ltd., POB 85, Limerick, Ireland) V.1- 1975- Volume(issue)/page/year: 17,313,1983

** MUTATION DATA **

TYPE OF TEST : Sex chromosome loss and nondisjunction
 ROUTE OF EXPOSURE : Oral
 TEST SYSTEM : Insect - Drosophila melanogaster
 DOSE/DURATION : 5 gm/L

REFERENCE :
 MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume(issue)/page/year: 261,9,1991

TYPE OF TEST : Unscheduled DNA synthesis
 TEST SYSTEM : Human Lung
 DOSE/DURATION : 10 mg/L

REFERENCE :
 JEPOEC Journal of Environmental Pathology, Toxicology and Oncology. (Chem-Orbital, POB 134, Park Forest, IL 60466) V.5(4)- 1984- Volume(issue)/page/year: 6(5/6),169,1986

TYPE OF TEST : Mutation test systems - not otherwise specified
 TEST SYSTEM : Human Fibroblast
 DOSE/DURATION : 10 mg/L

REFERENCE :
 MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume(issue)/page/year: 116,369,1983

TYPE OF TEST : Cytogenetic analysis
 TEST SYSTEM : Human Lymphocyte
 DOSE/DURATION : 10 mg/L

REFERENCE :
 MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume(issue)/page/year: 265,245,1992

TYPE OF TEST : Morphological transformation
 TEST SYSTEM : Rodent - rat Cells - not otherwise specified
 DOSE/DURATION : 400 ng/cm2

REFERENCE :
 CRNGDP Carcinogenesis (London). (Oxford Univ. Press, Pinkhill House, Southfield Road, Eynsham, Oxford OX8 1JJ, UK) V.1- 1980- Volume(issue)/page/year: 6,523,1985

TYPE OF TEST : Unscheduled DNA synthesis
 TEST SYSTEM : Rodent - rat Cells - not otherwise specified
 DOSE/DURATION : 4 ug/cm2

REFERENCE :
 MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume(issue)/page/year: 241,361,1990

TYPE OF TEST : Mutation test systems - not otherwise specified
 ROUTE OF EXPOSURE : Intratracheal
 TEST SYSTEM : Rodent - rat
 DOSE/DURATION : 2900 gm/L

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REFERENCE :

ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St.,
Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 57,175,1992

TYPE OF TEST : Cytogenetic analysis

ROUTE OF EXPOSURE : Intraperitoneal

TEST SYSTEM : Rodent - rat

DOSE/DURATION : 100 mg/kg

REFERENCE :

CNREA8 Cancer Research. (Public Ledger Building, Suit 816, 6th & Chestnut
Sts., Philadelphia, PA 19106) V.1- 1941- Volume(issue)/page/year:
48,6455,1988

TYPE OF TEST : Cytogenetic analysis

TEST SYSTEM : Rodent - rat Cells - not otherwise specified

DOSE/DURATION : 2 mg/L

REFERENCE :

NASGEJ NATO ASI Series, Series G: Ecological Sciences. (Springer-Verlag New
York, Inc., Service Center, 44 Hartz Way, Secaucus, NJ 07094) No.1- 1983-
Volume(issue)/page/year: 3,511,1985

TYPE OF TEST : Cytogenetic analysis

ROUTE OF EXPOSURE : Intratracheal

TEST SYSTEM : Rodent - rat

DOSE/DURATION : 2900 gm/L

REFERENCE :

ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St.,
Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 57,175,1992

TYPE OF TEST : Sex chromosome loss and nondisjunction

ROUTE OF EXPOSURE : Intraperitoneal

TEST SYSTEM : Rodent - rat

DOSE/DURATION : 100 mg/kg

REFERENCE :

CNREA8 Cancer Research. (Public Ledger Building, Suit 816, 6th & Chestnut
Sts., Philadelphia, PA 19106) V.1- 1941- Volume(issue)/page/year:
48,6455,1988

TYPE OF TEST : Morphological transformation

TEST SYSTEM : Rodent - mouse Cells - not otherwise specified

DOSE/DURATION : 10 mg/L

REFERENCE :

CSHCAL Cold Spring Harbor Conferences on Cell Proliferation. (Cold Spring
Harbor, NY) V.1-10, 1974-83. Volume(issue)/page/year: 4,941,1977

TYPE OF TEST : Cytogenetic analysis

ROUTE OF EXPOSURE : Intraperitoneal

TEST SYSTEM : Rodent - mouse

DOSE/DURATION : 50 mg/kg

REFERENCE :

MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE
Amsterdam, Netherlands) V.1- 1964- Volume(issue)/page/year: 319,303,1993

TYPE OF TEST : Micronucleus test

TEST SYSTEM : Rodent - hamster Embryo

DOSE/DURATION : 500 ng/cm2/48H

REFERENCE :

CNREA8 Cancer Research. (Public Ledger Building, Suit 816, 6th & Chestnut
Sts., Philadelphia, PA 19106) V.1- 1941- Volume(issue)/page/year:
44,5017,1984

TYPE OF TEST : Micronucleus test

TEST SYSTEM : Rodent - hamster Lung

DOSE/DURATION : 3297 ug/L

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REFERENCE :

MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume(issue)/page/year: 320,253,1994

TYPE OF TEST : Morphological transformation
 TEST SYSTEM : Rodent - hamster Embryo
 DOSE/DURATION : 250 ng/cm2

REFERENCE :

PAACA3 Proceedings of the American Association for Cancer Research. (Waverly Press, 428 E. Preston St., Baltimore, MD 21202) V.1- 1954- Volume(issue)/page/year: 24,96,1983

TYPE OF TEST : DNA inhibition
 TEST SYSTEM : Rodent - hamster Lung
 DOSE/DURATION : 62 mg/L

REFERENCE :

TIVIEQ Toxicology In Vitro. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.1- 1987- Volume(issue)/page/year: 1,71,1987

TYPE OF TEST : Mutation test systems - not otherwise specified
 TEST SYSTEM : Rodent - hamster Embryo
 DOSE/DURATION : 1 mg/L

REFERENCE :

ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 10,165,1975

TYPE OF TEST : Mutation test systems - not otherwise specified
 TEST SYSTEM : Rodent - hamster Ovary
 DOSE/DURATION : 10 mg/L

REFERENCE :

MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume(issue)/page/year: 116,369,1983

TYPE OF TEST : Cytogenetic analysis
 TEST SYSTEM : Rodent - hamster Lung
 DOSE/DURATION : 10 mg/L

REFERENCE :

CRNGDP Carcinogenesis (London). (Oxford Univ. Press, Pinkhill House, Southfield Road, Eynsham, Oxford OX8 1JJ, UK) V.1- 1980- Volume(issue)/page/year: 8,553,1987

TYPE OF TEST : Cytogenetic analysis
 TEST SYSTEM : Rodent - hamster Embryo
 DOSE/DURATION : 100 ug/L

REFERENCE :

ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 10,165,1975

TYPE OF TEST : Cytogenetic analysis
 TEST SYSTEM : Rodent - hamster Ovary
 DOSE/DURATION : 10 mg/L

REFERENCE :

CSHCAL Cold Spring Harbor Conferences on Cell Proliferation. (Cold Spring Harbor, NY) V.1-10, 1974-83. Volume(issue)/page/year: 4,941,1977

TYPE OF TEST : Sister chromatid exchange
 TEST SYSTEM : Rodent - hamster Ovary
 DOSE/DURATION : 100 ug/L

REFERENCE :

ENVRAL Environmental Research. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1967- Volume(issue)/page/year: 24,325,1981

TYPE OF TEST : Sex chromosome loss and nondisjunction
 TEST SYSTEM : Rodent - hamster Embryo

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DOSE/DURATION : 500 ng/cm2/48H

REFERENCE :

CNREA8 Cancer Research. (Public Ledger Building, Suit 816, 6th & Chestnut Sts., Philadelphia, PA 19106) V.1- 1941- Volume(issue)/page/year: 44,5017,1984

TYPE OF TEST : Sex chromosome loss and nondisjunction

TEST SYSTEM : Rodent - hamster Lung

DOSE/DURATION : 40 mg/L

REFERENCE :

CRNGDP Carcinogenesis (London). (Oxford Univ. Press, Pinkhill House, Southfield Road, Eynsham, Oxford OX8 1JJ, UK) V.1- 1980- Volume(issue)/page/year: 8,553,1987

TYPE OF TEST : Mutation in mammalian somatic cells

TEST SYSTEM : Rodent - hamster Lung

DOSE/DURATION : 10 mg/L

REFERENCE :

MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume(issue)/page/year: 68,265,1979

*** REVIEWS ***

ACGIH TLV-Confirmed human carcinogen

DTLVS* The Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) booklet issues by American Conference of Governmental Industrial Hygienists (ACGIH), Cincinnati, OH, 1996 Volume(issue)/page/year: TLV/BEI,1997

ACGIH TLV-STEL 2 fibers/cc, longer than 5 um

DTLVS* The Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) booklet issues by American Conference of Governmental Industrial Hygienists (ACGIH), Cincinnati, OH, 1996 Volume(issue)/page/year: TLV/BEI,1997

IARC Cancer Review:Human Sufficient Evidence

IMEMDT IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man. (WHO Publications Centre USA, 49 Sheridan Ave., Albany, NY 12210) V.1- 1972- Volume(issue)/page/year: 2,17,1973

IARC Cancer Review:Animal Sufficient Evidence

IMEMDT IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man. (WHO Publications Centre USA, 49 Sheridan Ave., Albany, NY 12210) V.1- 1972- Volume(issue)/page/year: 2,17,1973

IARC Cancer Review:Human Sufficient Evidence

IMEMDT IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man. (WHO Publications Centre USA, 49 Sheridan Ave., Albany, NY 12210) V.1- 1972- Volume(issue)/page/year: 14,11,1977

IARC Cancer Review:Animal Sufficient Evidence

IMEMDT IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man. (WHO Publications Centre USA, 49 Sheridan Ave., Albany, NY 12210) V.1- 1972- Volume(issue)/page/year: 14,11,1977

IARC Cancer Review:Group 1

IMSUDL IARC Monographs, Supplement. (WHO Publications Centre USA, 49 Sheridan Ave., Albany, NY 12210) No.1- 1979- Volume(issue)/page/year: 7,106,1987

TOXICOLOGY REVIEW

31BYAP "Experimental Lung Cancer: Carcinogenesis and Bioassays, International Symposium, 1974," Karbe, E., and J.F. Park, eds., Springer-Verlag New York, Inc., 1974 Volume(issue)/page/year: -,93,1974

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*** U.S. STANDARDS AND REGULATIONS ***

MSHA STANDARD-air:TWA 5 fb/cc (fb > 5 um)
 DTLWS* "Documentation of the Threshold Limit Values for Substances in
 Workroom Air," Supplements. For publisher information, see 85INA8.
 Volume(issue)/page/year: 3,33,1973

OSHA-cancer hazard
 CFRGBR Code of Federal Regulations. (U.S. Government Printing Office, Supt.
 of Documents, Washington, DC 20402) Volume(issue)/page/year:
 29,1910.1001,1987

*** OCCUPATIONAL EXPOSURE LIMITS ***

OEL-FRANCE:TWA 1 fiber/ml JAN 1993

OEL-SWITZERLAND:TWA 1 fiber/ml;Carcinogen JAN 1993

OEL-UNITED KINGDOM:TWA 0.5 fiber/ml/4H JAN 1993

OEL-UNITED KINGDOM:TWA 1.5 fiber/ml/10H JAN 1993

OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV

OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGIH TLV

*** NIOSH STANDARDS DEVELOPMENT AND SURVEILLANCE DATA ***

NIOSH RECOMMENDED EXPOSURE LEVEL (REL) :

NIOSH REL TO ASBESTOS-air:100M TWA 0.1 fb/cc in a 400L air sample

REFERENCE :

NIOSH* National Institute for Occupational Safety and Health, U.S. Dept. of
 Health, Education, and Welfare, Reports and Memoranda.
 Volume(issue)/page/year: DHHS #92-100,1992

NIOSH OCCUPATIONAL EXPOSURE SURVEY DATA :

NOES - National Occupational Exposure Survey (1983)

NOES Hazard Code - T1575

No. of Facilities: 5924 (estimated)

No. of Industries: 45

No. of Occupations: 48

No. of Employees: 92033 (estimated)

No. of Female Employees: 13262 (estimated)

*** STATUS IN U.S. ***

EPA GENETOX PROGRAM 1988, Positive: Carcinogenicity-mouse/rat

EPA GENETOX PROGRAM 1988, Negative: TRP reversion

EPA TSCA Section 8(d) unpublished health/safety studies

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JUNE 1998

NIOSH Analytical Method, 1994: Asbestos (bulk) by PLM, 9002; by PCM, 7400;
 by TEM, 7402

NIOSH Analytical Method, 1994: Asbestos, chrysotile by XRD, 9000

NTP Carcinogenesis Studies (feed):some evidence:rat

NTPTR* National Toxicology Program Technical Report Series. (Research
 Triangle Park, NC 27709) No.206- Volume(issue)/page/year: NTP-TR-295,85

NTP Carcinogenesis Studies (feed);no evidence:hamster
 NTPTR* National Toxicology Program Technical Report Series. (Research
 Triangle Park, NC 27709) No.206- Volume(issue)/page/year: NTP-TR-246,90

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NTP 7th Annual Report on Carcinogens, 1992 : known to be carcinogenic

*** END OF RECORD ***

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CHEM SERVICE -- BIS(2-ETHYLHEXYL)PHTHALATE, F66
MATERIAL SAFETY DATA SHEET
NSN: 681000N075709
Manufacturer's CAGE: 8Y898
Part No. Indicator: A
Part Number/Trade Name: BIS(2-ETHYLHEXYL)PHTHALATE, F66

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General Information

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Company's Name: CHEM SERVICE INC
Company's P. O. Box: 3108
Company's City: WEST CHESTER
Company's State: PA
Company's Country: US
Company's Zip Code: 19381
Company's Emerg Ph #: 610-692-3026
Company's Info Ph #: 610-692-3026
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 02MAY94
Safety Data Review Date: 02JAN97
MSDS Serial Number: CCWVN

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: PHTHALIC ACID, BIS(2-ETHYLHEXYL)ESTER; (BIS(2-ETHYLHEXYL)
PHTHALATE) (SARA 313) (CERCLA)
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: T10350000
CAS Number: 117-81-7
OSHA PEL: 5 MG/M3
ACGIH TLV: 5 MG/M3

Proprietary: NO
Ingredient: SUPDAT:SURE AIRWAY DOES NOT BECOME OBSTRUCTED BY VOMIT. GET
MED ATTN IF NEC. NOTE:AN ANTIDOTE IS A SUBSTANCE (ING 3)
Ingredient Sequence Number: 02
NIOSH (RTECS) Number: 99999992Z
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 2:INTENDED TO COUNTERACT EFT OF POIS. IT SHOULD BE ADMIN
ONLY BY MD/TRAINED EMER PERS. MED ADVICE CAN BE (ING 4)
Ingredient Sequence Number: 03
NIOSH (RTECS) Number: 99999992Z
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 3:OBTAINED FROM A POISON CONTROL CENTER.
Ingredient Sequence Number: 04
NIOSH (RTECS) Number: 99999992Z
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

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Physical/Chemical Characteristics

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Appearance And Odor: COLORLESS LIQUID.
Boiling Point: 723F, 384C
Melting Point: -58F, -50C

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Vapor Pressure (MM Hg/70 F): <0.01 @20C
Specific Gravity: 0.985
Solubility In Water: INSOL (IMMISCIBLE)

Fire and Explosion Hazard Data

Flash Point: 405F, 207C
Extinguishing Media: CARBON DIOXIDE, DRY CHEMICAL POWDER OR SPRAY.
Special Fire Fighting Proc: USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NO EXPLOSION LIMITS ARE AVAILABLE FOR THIS COMPOUND.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: INCOMPATIBLE W/STRONG OXIDIZING AGENTS.
Hazardous Decomp Products: DECOMPOSITION LIBERATES TOXIC FUMES.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: LD50: (ORAL, RAT) 31,000 MG/KG.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS - AVOID DIRECT PHYSICAL CONTACT! SUSPECTED CARCINOGEN - MAY PRODUCE CANCER. MAY BE HARMFUL IF ABSORBED THROUGH SKIN, INHALED OR SWALLOWED. CAN CAUSE EYE & SKIN IRRITATION. DUST AND/OR VAPORS CAN CAUSE IRRITATION TO RESPIRATORY TRACT. CAN BE IRRITATING TO (EFTS OF OVEREXP)
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: PHTHALIC ACID, BIS(2-ETHYLHEXYL)ESTER: IARC MONOGRAPHS, SUPP, VOL 7, PG 56, 1987: GRP 2B. NTP 7TH ANNUAL RPT ON (SUPP DATA)
Signs/Symptoms Of Overexp: HLTH HAZ: MUCOUS MEMBRANES. THIS CHEMICAL IS CONSIDERED TO BE A CARCINOGEN BY THE STATE OF CALIFORNIA. THIS COMPOUND IS GENERALLY CONSIDERED TO BE NON-TOXIC, BASED ON OSHA'S ASSESSMENT OF THE LD50.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES: FLUSH CONTINUOUSLY W/WATER FOR AT LST 15-20 MINS. SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NO BURNS HAVE OCCURRED- USE SOAP & WATER TO CLEANSE SKIN. REMOVE & WASH CONTAM CLTHG. INHAL: REMOVE PATIENT TO FRESH AIR. ADMIN OXYG IF PATIENT IS HAVING DIFFICULTY BRTHG. IF PATIENT HAS STOPPED BRTHG ADMIN ARTF RESP. IF PATIENT IS IN CARDIAC ARREST ADMIN CPR. CONTINUE LIFE SUPPORTING MEASURES UNTIL MED (SUPDAT)

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUATE AREA. WEAR APPROPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE OR SIMILAR MATERIAL. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL REGULATIONS (FP N). BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AFTERBURNER & SCRUBBER.
Precautions-Handling/Storing: AVOID CONTACT W/SKIN, EYES & CLOTHING. DO NOT BREATHE VAPORS. KEEP TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS.

519 247

Other Precautions: PERS NOT SPECIFICALLY & PROPERLY TRAINED SHOULD NOT HANDLE THIS CHEM/ITS CNTNR. THIS PROD IS FURNISHED FOR LAB USE ONLY! MFR'S PRODS MAY NOT BE USED AS DRUGS, COSMETICS, AGRICULTURAL/PESTICIDAL PRODS, FOOD ADDITIVE/AS HOUSEHOLD CHEMICALS.

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Control Measures

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Respiratory Protection: NIOSH APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).

Ventilation: THIS CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.

Protective Gloves: IMPERVIOUS GLOVES (FP N).

Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).

Other Protective Equipment: EYE WASH FOUNTAIN & DELUGE SHOWER WHICH MEET ANSI DESIGN CRITERIA (FP N). USE APPROP NIOSH APPROVED SAFETY EQUIPMENT.

Work Hygienic Practices: CONTACT LENSES SHOULD NOT BE WORN IN THE LABORATORY.

Suppl. Safety & Health Data: EXPLAN OF CARCIN:CARCINS, 1994:ANTIC TO BE CARCIN. ANIMAL:LIVER, TESTES. FIRST AID PROC:ASSISTANCE HAS ARRIVED. INGEST:IF PATIENT IS EXHIBITING SIGNS OF SHOCK - KEEP WARM & QUIET. CONT POIS CTL CTR IMMED IF NEC. DO NOT ADMIN LIQS/INDUCE VOMIT TO UNCON/ CONVULSING PERS. IF PATIENT IS VOMIT-WATCH CLOSELY TO MAKE (ING 2)

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Transportation Data

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Disposal Data

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Label Data

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Label Required: YES

Technical Review Date: 02JAN97

Label Date: 26DEC96

Label Status: G

Common Name: BIS(2-ETHYLHEXYL)PHTHALATE, F66

Chronic Hazard: YES

Signal Word: WARNING!

Acute Health Hazard-Moderate: X

Contact Hazard-Moderate: X

Fire Hazard-Slight: X

Reactivity Hazard-Slight: X

Special Hazard Precautions: DECOMPOSITION PRODUCTS MAY BE TOXIC. ACUTE:EYE AND SKIN IRRITATION. RESPIRATORY TRACT IRRITATION. MUCOUS MEMBRANE IRRITATION. CHRONIC:CANCER HAZARD. CONTAINS PHTHALIC ACID, BIS(2-ETHYLHEXYL)ESTER, WHICH IS LISTED AS AN ANIMAL LIVER CARCINOGEN (FP N).

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: CHEM SERVICE INC

Label P.O. Box: 3108

Label City: WEST CHESTER

Label State: PA

Label Zip Code: 19381

Label Country: US

Label Emergency Number: 610-692-3026

WITCO MATERIAL SAFETY DATA SHEET

519 248

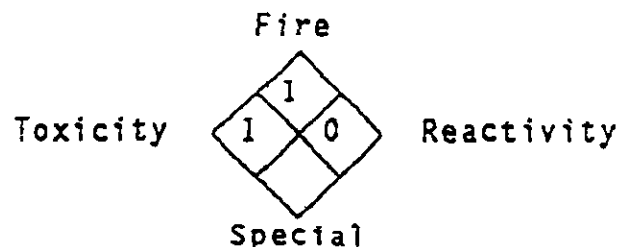
KENDALL FOUR SEASONS HYDRAULIC FLUID

PAGE 1

-22,32,46,68,100 and 150

NFPA HAZARD RATING

4 - Extreme
3 - High
2 - Moderate
1 - Slight
0 - Insignificant



DIVISION AND LOCATION---SECTION I

Division: KENDALL REFINING COMPANYLocation: BRADFORD, PENNSYLVANIA

77 N. KENDALL AVE., BRADFORD, PA, 16701

Emergency Telephone Number: (814) 368-6111Transportation Emergency: CHEMTREC 1-(800) 424-9300 (U.S. and Canada)

CHEMICAL AND PHYSICAL PROPERTIES---SECTION II

Chemical Name:

petroleum hydrocarbon

Formula: not applicableHazardous Decomposition Products:

carbon monoxide and carbon dioxide from burning.

oxides of phosphorous from burning

oxides of sulfur

Incompatibility (Keep away from):

strong oxidizers such as hydrogen peroxide, bromine, and chromic acid.

Toxic and Hazardous Ingredients:

none

Form: liquidOdor: blandAppearance: liquidColor: amberSpecific Gravity (water=1): .87 to .88Boiling Point: greater than 330°C (625°F)Melting Point: less than -18°C (0°F)Solubility in Water--(by weight %): 0 at 20°CVolatile (by weight %): 0Evaporation Rate: 0Vapor Pressure (mm Hg at 20°C): 0Vapor Density (air=1): not volatilepH (as is): not applicableStability: Product is stable under normal conditionsViscosity SUS at 100°F: Greater than or = to 100

(Continued on next page)

WITCO MATERIAL SAFETY DATA SHEET

KENDALL FOUR SEASONS HYDRAULIC FLUID

PAGE 2

-22,32,46,68,100 and 150

FIRE AND EXPLOSION DATA---SECTION III

Special Fire Fighting Procedures:

Do not use water except as fog.

Unusual Fire and Explosion Hazards:

none

Flashpoint: (Method Used) Cleveland open cup greater than 200°C (390°F)Flammable limits %: not applicableExtinguishing agents:Drychemical or Waterfog or CO₂ or Foam

Closed containers exposed to fire may be cooled with water.

HEALTH HAZARD DATA---SECTION IV

Permissible concentrations (air):

see COMMENTS section

Chronic effects of overexposure:

no data available

Acute toxicological properties:

no data available

Emergency First Aid Procedures:Eyes: Immediately flush with large quantities of water for at least 15 minutes and call a physician.Skin Contact: Remove excess with cloth or paper. Wash thoroughly with soap and water.Inhalation: Remove victim to fresh air. Call a physician.If Swallowed: Contact a physician immediately.

SPECIAL PROTECTION INFORMATION---SECTION V

Ventilation Type Required (Local, mechanical, special):

see COMMENTS section

Respiratory Protection (Specify type): -

Use NIOSH/MSHA certified respirator with dual organic vapor/mist and particulates cartridge if vapor concentration exceeds permissible exposure limit.

Protective Gloves:

neoprene type

Eye Protection:

chemical safety goggles

Other Protective Equipment:

none

(Continued on next page)

WITCO MATERIAL SAFETY DATA SHEET

KENDALL FOUR SEASONS HYDRAULIC FLUID
AW-22,32,46,68,100 and 150

PAGE 3

HANDLING OF SPILLS OR LEAKS---SECTION VI

Procedures for Clean-Up:

Transfer bulk of mixture into another container. Absorb residue with an inert material such as earth, sand, or vermiculite. Sweep up and dispose as solid waste in accordance with local, state, and federal regulations.

Waste Disposal:

Dispose of in accordance with all applicable federal, state and local regulations.

SPECIAL PRECAUTIONS---SECTION VII

Precautions to be taken in handling and storage:

Do not handle or store at temperatures over

Maximum Storage Temperature: 38°C (100°F)

TRANSPORTATION DATA---SECTION VIII

D.O.T.: Not Regulated

Reportable Quantity: not applicable

Freight Classification: Petroleum Lubricating Oil

Special Transportation Notes:

none

ENVIRONMENTAL/SAFETY REGULATIONS---SECTION IX

Section 313 (Title III Superfund Amendment and Reauthorization Act):

This product does not contain any chemical in sufficient quantity to be subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

COMMENTS

If used in applications where a mist may be generated, observe a TWA/PEL of 5 mg/m³ for mineral oil mist (OSHA and ACGIH).

*

STATE REGULATORY INFORMATION:

Pennsylvania Worker And Community Right To Know Act: This product contains the following ingredient(s).

Hydrocarbon oils CAS. NO. 8020-83-5

The additive mixtures in this product have been declared a trade secret by the additive manufacturers.

(Continued on next page)

WITCO MATERIAL SAFETY DATA SHEET

KENDALL FOUR SEASONS HYDRAULIC FLUID
22,32,46,68,100 and 150

PAGE 4

(COMMENTS continued)

Prepared by: Robert KellamTitle: Group Supervisor, Lubricants Testing, Maintenance, and SafetyOriginal Date: 05/24/89 Sent to: _____Revision Date: 08/09/94 _____Supersedes: 04/01/93 _____Date Sent: _____

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

MOBIL OIL -- DIESEL FUEL (MRDUS) - DIESEL FUEL
MATERIAL SAFETY DATA SHEET
NSN: 9140002865286
Manufacturer's CAGE: 3U728
Part No. Indicator: B
Part Number/Trade Name: DIESEL FUEL (MRDUS)

General Information

Item Name: DIESEL FUEL
Company's Name: MOBIL OIL CORP
Company's Street: 3225 GALLONS ROAD
Company's City: FAIRFAX
Company's State: VA
Company's Country: US
Company's Zip Code: 22037-0001
Company's Emerg Ph #: 609-737-4411/CHEMTREC 800-424-9300
Company's Info Ph #: 800-662-4525/800-227-0707 X3265
Record No. For Safety Entry: 024
Tot Safety Entries This Stk#: 048
Status: SE
Date MSDS Prepared: 02DEC93
Safety Data Review Date: 19OCT94
Supply Item Manager: KY
MSDS Preparer's Name: ENVIRONMENTAL HEALTH
Preparer's Company: MOBIL OIL CORP., PRODUCT FORMULATION
Preparer's St Or P. O. Box: 3225 GALLONS ROAD
Preparer's City: FAIRFAX
Preparer's State: VA
Preparer's Zip Code: 22037
MSDS Serial Number: BVHCG
Specification Number: VV-F-800
Spec Type, Grade, Class: DF-1 GRADE
Hazard Characteristic Code: F4
Unit Of Issue: GL
Unit Of Issue Container Qty: BULK
Type Of Container: TANK
Net Unit Weight: UNKNOWN

Ingredients/Identity Information

Proprietary: NO
Ingredient: NO. 2 DIESEL FUEL
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: HZ1800000
CAS Number: 68334-30-5
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: CLEAR (MAY BE DYED) LIQUID WITH A HYDROCARBON ODOR.
Boiling Point: >300F, >149C
Melting Point: N/A
Vapor Pressure (MM Hg/70 F): 0.5 @20C
Specific Gravity: 0.82-0.87
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: UNKNOWN
Solubility In Water: NEGLIGIBLE
Viscosity: >1.0 @ 40C

Fire and Explosion Hazard Data

Flash Point: >125F,>52C
Flash Point Method: PMCC
Lower Explosive Limit: 0.6
Upper Explosive Limit: 7.0
Extinguishing Media: CARBON DIOXIDE, FOAM, DRY CHEMICAL AND WATER FOG.
Special Fire Fighting Proc: USE WATER TO KEEP FIRE EXPOSED CONTAINERS COOL. WATER SPRAY MAY BE USED TO FLUSH SPILLS AWAY FROM EXPOSURES. PREVENT RUNOFF FROM ENTERING WATER SUPPLY.
Unusual Fire And Expl Hazrds: MATERIAL IS COMBUSTIBLE.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HEAT, SPARKS, FLAME AND BUILD-UP OF STATIC ELECTRICITY.
Materials To Avoid: HAOLGENS, STRONG ACIDS, ALKALIES AND OXIDIZERS.
Hazardous Decomp Products: CARBON MONOXIDE
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: ORAL LD50 (RAT) >2,000 MG/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: EYES: IRRITATION. SKIN: PROLONGED, REPEATED SKIN CONTACT MAY RESULT IN SKIN IRRITATION OR MORE SERIOUS SKIN DISORDERS. INHALATION: DIZZINESS, NAUSEA OR UNCONSCIOUSNESS. INGESTION: IF MATERIAL IS ASPIRATED INTO THE LUNGS, MAY CAUSE CHEMICAL PNEUMONITIS.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: POSSIBLE CARCINOGENIC HAZARD MAY EXIST.
Signs/Symptoms Of Overexp: THIS PRODUCT CONTAINS POLYCYCLIC AROMATIC HYDROCARBONS, SOME OF WHICH HAVE BEEN REPORTED TO CAUSE SKIN CANCER IN HUMANS UNDER CONDITIONS OF POOR PERSONAL HYGIENE, PROLONGED REPEATED CONTACT AND EXPOSURE TO SUNLIGHT. PROLONGED SKIN CONTACT ON LABORATORIES ANIMALS HAS CAUSE TOXIC EFFECTS SUCH AS SKIN CANCER, LIVER DAMAGE
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYE CONTACT: FLUSH THOROUGHLY WITH WATER. IF IRRITATION OCCURS, CALL A PHYSICIAN. SKIN: DRY-WIPE THE SKIN. CLEANSE THE AREA WITH WATERLESS HAND CLEANER, FOLLOW BY WASHING WITH SOAP AND WATER. INHALATION: REMOVE FROM FURTHER EXPOSURE. IF RESPIRATORY PROBLEMS OCCUR, SEEK IMMEDIATE MEDICAL ASSISTANCE. INGESTION: DO NOT INDUCE VOMITING. GIVE 1 TO 2 GLASSES OF WATER. GET MEDICAL ASSISTANCE.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ADSORB ON FIRE RETARDANT TREATED SAWDUST, DIATOMACEOUS EARTH, ETC. SHOVEL UP AND DISPOSE OF AT AN APPROPRIATE WASTE DISPOSAL FACILITY IN ACCORDANCE WITH CURRENT APPLICABLE LAWS AND REGULATIONS, AND PRODUCT CHARACTERISTICS AT TIME OF DISPOSAL.
Neutralizing Agent: NOT APPLICABLE
Waste Disposal Method: PRODUCT IS SUITABLE FOR BURNING FOR FUEL VALUE IN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.
Precautions-Handling/Storing: HARMFUL IN CONTACT WITH OR IF ABSORBED THROUGH THE SKIN. AVOID INHALATION OF VAPORS OR MISTS. STORE IN A COOL AREA. GROUND AND BOND TRANSFER EQUIPMENT
Other Precautions: A FLAMMABLE ATMOSPHERE CAN BE PRODUCED IN STORAGE TANK HEADSPACES EVEN WHEN STORED AT A TEMPERATURE BELOW THE FLASHPOINT. ENSURE THAT THERE ARE NO IGNITION SOURCES IN THE AREA IMMEDIATELY SURROUNDING

FILLING AND VENTING OPERATIONS.

Control Measures

Respiratory Protection: NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITION OF USE AND WITH ADEQUATE VENTILATION.
Ventilation: USE IN WELL VENTILATED AREA. VENTILATION DESIRABLE AND EQUIPMENT SHOULD BE EXPLOSION PROOF.
Protective Gloves: IMPERVIOUS GLOVES
Eye Protection: USE CHEMICAL SAFETY GOGGLES
Other Protective Equipment: EYE WASH STATION & SAFETY SHOWER. IF CONTACT IS LIKELY OIL IMPERVIOUS CLOTHING MUST BE WORN.
Work Hygienic Practices: GOOD PERSONAL HYGIENE MUST BE PRACTICED.
Suppl. Safety & Health Data: WASH OR TAKE SHOWER IF GENERAL CONTACT OCCURS. REMOVE OIL-SOAKED CLOTHING AND LAUNDER BEFORE REUSE. DISCARD CONTAMINATED LEATHER GLOVES AND SHOES.

Transportation Data

Trans Data Review Date: 94292
DOT PSN Code: EXF
DOT Symbol: D
DOT Proper Shipping Name: DIESEL FUEL
DOT Class: 3
DOT ID Number: NA1993
DOT Pack Group: III
DOT Label: NONE
IMO PSN Code: HRR
IMO Proper Shipping Name: GAS OIL
IMO Regulations Page Number: 3375
IMO UN Number: 1202
IMO UN Class: 3.3
IMO Subsidiary Risk Label: -
IATA PSN Code: MTX
IATA UN ID Number: 1202
IATA Proper Shipping Name: GAS OIL
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MTX
AFI Prop. Shipping Name: GAS OIL OR DIESEL FUEL OR HEATING OIL, LIGHT
AFI Class: 3
AFI ID Number: UN1202
AFI Pack Group: III
AFI Basic Pac Ref: 7-7

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 19OCT94
MFR Label Number: NONE
Label Status: F
Common Name: DIESEL FUEL (MRDUS)
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-Moderate: X
Reactivity Hazard-None: X
Special Hazard Precautions: EYES: IRRITATION. SKIN: PROLONGED, REPEATED SKIN CONTACT MAY RESULT IN SKIN IRRITATION OR MORE SERIOUS SKIN DISORDERS. INHALATION: DIZZINESS, NAUSEA OR UNCONSCIOUSNESS. INGESTION: IF MATERIAL IS ASPIRATED INTO THE LUNGS, MAY CAUSE CHEMICAL PNEUMONITIS. HARMFUL IN

CONTACT WITH OR IF ABSORBED THROUGH THE SKIN. AVOID INHALATION OF VAPORS OR MISTS. STORE IN A COOL AREA. GROUND AND BOND TRANSFER EQUIPMENT. TARGET ORGANS: SKIN, RESPIRATORY TRACT.

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: MOBIL OIL CORP

Label Street: 3225 GALLONS ROAD

Label City: FAIRFAX

Label State: VA

Label Zip Code: 22037-0001

Label Country: US

Label Emergency Number: 609-737-4411/CHEMTREC 800-424-9300

519 256

KOCH REFINING -- 0900 UNLEADED GASOLINE, 87 OCTANE - GASOLINE, AUTOMOTIVE
MATERIAL SAFETY DATA SHEET

JSN: 9130001487103

Manufacturer's CAGE: 3V260

Part No. Indicator: B

Part Number/Trade Name: 0900 UNLEADED GASOLINE, 87 OCTANE

General Information

Item Name: GASOLINE, AUTOMOTIVE
Company's Name: KOCH REFINING CO INC
Company's Street: SUNTIDE RD
Company's P. O. Box: 2608
Company's City: CORPUS CHRISTI
Company's State: TX
Company's Country: US
Company's Zip Code: 78403
Company's Emerg Ph #: 800-424-9300 (CHEMTREC) / 512-241-4811
Company's Info Ph #: 512-241-4811 / 316-832-8488
Record No. For Safety Entry: 073
Tot Safety Entries This Stk#: 120
Status: FE
Date MSDS Prepared: 14APR94
Safety Data Review Date: 26MAR96
Supply Item Manager: KY
Preparer's Company: ENVIRIO, HEALTH & SAFETY
Preparer's St Or P. O. Box: KOCH INDUSTRIES, INC
MSDS Serial Number: BYHHF
Specification Number: VV-G-001690A
Spec Type, Grade, Class: CLASS A,B,C,D,E, REG
Hazard Characteristic Code: F2

Ingredients/Identity Information

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS LIQUID W/SHARP, PENETRATING, AROMATIC ODOR.
Boiling Point: 90.0F, 32.2C
Melting Point: -130F, -90C
Vapor Pressure (MM Hg/70 F): 348-698
Vapor Density (Air=1): 3-4
Specific Gravity: 0.73
Evaporation Rate And Ref: MODERATELY FAST, WATER=1
Solubility In Water: NEGLIGIBLE.
Percent Volatiles By Volume: 100
pH: NEUTRA

Fire and Explosion Hazard Data

Flash Point: -40F, -40C
Lower Explosive Limit: 1.4
Upper Explosive Limit: 7.6
Extinguishing Media: NONE SPECIFIED BY MANUFACTURER.
Special Fire Fighting Proc: NONE SPECIFIED BY MANUFACTURER.
Unusual Fire And Expl Hazrds: DANGER! EXTREMELY FLAMM. VAP MAY CAUSE FLASH FIRE.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): ALL SOURCES OF IGNITION.

Materials To Avoid: INCOMPATIBLE W/OXIDIZING AGENTS.

Hazardous Decomp Products: COMBUSTION MAY PRODUCE CO, NOX, SOX & REACTIVE HYDROCARBONS.

Conditions To Avoid (Poly): NONE SPECIFIED BY MANUFACTURER.

Health Hazard Data

LD50-LC50 Mixture: UNKNOWN

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: WARNING! MAY CAUSE CARDIAC SENSITIZATION.

ASPIRATION HAZ IF SWALLOWED-CAN ENTER LUNGS & CAUSE DMG.OVEREXPO MAY CAUSE

CNS DEPRESS.MAY BE IRRIT TO SKIN/EYES/RESP TRACT.POTENTIAL CANCER HAZ.

CONTAINS BENZENE--KNOWN HUMAN CARCINOGEN.INGEST:SLIGHTLY TOXIC.IRRIT OF

MOUTH/THROAT/GI TRACT.SKIN:SLIGHTLY IRRIT.DEFAT AGENT.(SUPPLEM)

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: YES

Explanation Carcinogenicity: CONTAINS Benzene [71-43-2] WHICH IS LISTED BY NTP AND IARC AND REGULATED BY OSHA AS A CARCINOGEN.

Signs/Symptoms Of Overexp: INGEST:SALV, PAIN, NAU, VOMIT, DIARR.ASPIRATION INTO LUNGS MAY CAUSE CHEM PNEU/LUNG DMG.OVEREXPO MAY CAUSE SYSTEMIC DMG INCLUDING TARGET ORGAN EFFECTS KIDNEY, LIVER, CNS.SKIN: DRYING, REDDENING, ITCH, PAIN, INFLAMM, CRACK, 2ND INFECTION W/TISSUE DMG.INHAL: CARDIAC SENS, ARRHYTHMIAS, DEATH FRM CARDIAC ARREST.

Med Cond Aggravated By Exp: PRE-EXISTING MED CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE INCLUDE DISORDERS OF SKIN, KIDNEY, LIVER & RESP TRACT.

Emergency/First Aid Proc: INGEST:DO NOT INDUCE VOMIT-ASPIRATION HAZ.IF SPONT KEEP HEAD BELOW HIPS.MONITOR BREATH.KEEP WARM/@REST.GASTRIC LAVAGE. SKIN:IMMED WASH W/PLENTY OF SOAP/WATER WHILE REMOVE CONTMAIN CLOTH/SHOE. EYE:FLUSH IMMED W/LG AMTS OF WATER @LEAST 15MINS,OPN EYELIDS.INHAL:REMOVE TO FRESH AIR.NOT BREATH GIVE CPR.BREATH DIFFI CLEAR AIRWAY/GIVE OXY.KEEP WARM/@REST.IN ALL CASES IRRIT PERSIST/DEVELOPS GET IMMED MED AT

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE ALL IGN SOURCES.ISOLATE HAZ AREA/DENY ENTRY.TAKE IMMED STEPS TO STOP/CONTAIN SPILL.EXERCISE CAUTION REGARDING PERSONNEL SAFT/EXPO.NOTIFY PROPER AUTHORITIES;RQ=333LBS.ABSORB W/INERT MATL.PLACE IN CHEM WASTE CNTNR.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Method: AS SUPPLIED HAZ WASTE DUE TO BENZENE & IGNIT.

DISPOSE IAW 40CFR IN PROPERLY PERMITTED FACIL.CHECK STATE/LOC REGS.CHEM

ADDN/PROCESSING/ALTERING MATL MAKE WASTE MANAGEMENT INFO PRESENT

INCOMPLETE/INACCUT/INAPPROP.DISPOSE OF IAW ALL FED/STATE/LOC REGS.

Precautions-Handling/Storing: STORE TIGHTLY CLSD CNTNR @COOL DRY ISOLATED WELL VENTI AREA AWAY FRM HEAT/IGN SOURCES/INCOMP.AVOID STRG OXIDIZERS CONTACT.DON'T EAT/SMOK/DRK NEAR MATL

Other Precautions: GROUND LINES/EQPMT WHEN TRANSFER PROD.USE OF ANY HYDROCARBON FUEL IN AREA W/O ADEQUA VENTI MAY RESULT IN HAZ COMBUST PROD/ INADEQUA OXY LEVELS.GASOLINE ONE OF SOLVTS USED BY CHEM SUBST ABUSERS; PRESENT ACUTE/CHRONIC CNS SIGNS/SYMP/ARRHYTHMIAS

Control Measures

Respiratory Protection: NIOSH/MSHA APPROVED AIR PURIFYING RESP (LIMITED PROT)W/ORG VAP CARTRIDGE/CANISTER MAY BE PERMISSIBLE UNDER CERTAIN CIRCUMSTANCES WHERE AIRBORNE CONCEN EXPECTED TO EXCEED EXPO LIMITS.USE +PRESS AIR SUPPLIED RESP FOR UNK CONCEN/ADEQU PROTECT

Ventilation: VENTILATION & OTHER FORMS OF ENGINEERING CONTROLS ARE PREFERRED MEANS FOR CONTROLLING EXPOSURES.

Protective Gloves: APPROPRIATE CHEM PROT GLOVES.

Eye Protection: CHEM SAFTY GOGG, FACE SHILED.
 Other Protective Equipment: EYEWASH FACILITY.USE GOOD PERSONAL HYGIENE.USE
 NON-SPARKS TOOL.
 Work Hygienic Practices: LAUNDER/DISCARD CONTAMIN CLOTH;MEANWHILE KEEP IN
 CLSD CNTNR.INFORM CLEANERS OF CONTMAIN.DISCARD CONTAMIN LEATHER GOODS.
 Suppl. Safety & Health Data: HEALTH HAZ:REPEAT/PROLONG CONTACT W/LG AMTS
 SLIGHT TRANSIENT IRRIT,LACRIMATION,BURNING SENSATION.IRRIT/CONJUCNTIVITIS.
 INHAL:NON TO SLIGHTLY TOXIC.IRRIT NOSE/THROAT/LUNGS.CNS DEPRESS. EMPTY
 CNTNRS CONTAIN PROD RESIDUE-TAKE NECESSARY PRECAUTIONS.

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Transportation Data

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Disposal Data

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Label Data

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Label Required: YES
 Label Status: G
 Common Name: 0900 UNLEADED GASOLINE, 87 OCTANE
 Special Hazard PreCautions: WARNING!MAY CAUSE CARDIAC SENSITIZATION.
 ASPIRATION HAZ IF SWALLOWED-CAN ENTER LUNGS & CAUSE DMG.OVEREXPO MAY CAUSE
 CNS DEPRESS.MAY BE IRRIT TO SKIN/EYES/RESP TRACT.POTENTIAL CANCER HAZ.
 CONTAINS BENZENE--KNOWN HUMAN CARCINOGEN.INGEST:SLIGHTLY TOXIC.IRRIT OF
 MOUTH/THROAT/GI TRACT.SKIN:SLIGHTLY IRRIT.DEFAT AGENT.(SUPPLEM)INGEST:SALV,
 PAIN,NAU,VOMIT,DIARR.ASPIRATION INTO LUNGS MAY CAUSE CHEM PNEU/LUNG DMG.
 OVEREXPO MAY CAUSE SYSTEMIC DMG INCLUDING TARGET ORGAN EFFECTS KIDNEY,
 LIVER,CNS.SKIN:DRYING,REDDENING,ITCH,PAIN,INFLAMM,CRACK,2ND INFECTION W/
 TISSUE DMG.INHAL:CARDIAC SENS,ARRHYTHMIAS,DEATH FRM CARDIAC ARREST.
 Label Name: KOCH REFINING CO INC
 Label Street: SUNTIDE RD
 Label P.O. Box: 2608
 Label City: CORPUS CHRISTI
 Label State: TX
 Label Zip Code: 78403
 Label Country: US
 Label Emergency Number: 800-424-9300 (CHEMTREC) /512-241-4811

International Chemical Safety Cards

LEAD**ICSC: 0052**

<p style="text-align: center;">LEAD Lead metal Plumbum (powder) Pb Atomic mass: 207.2</p> <p>CAS # 7439-92-1 RTECS # OF7525000 ICSC # 0052</p>			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Finely divided lead powder is flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking (if in powder form).	In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
• INHALATION	Abdominal cramps. Drowsiness. Headache. Nausea. Vomiting. Weakness. Wheezing. Pallor. Hemoglobinuria. Collapse.	Ventilation (not if powder). Avoid inhalation of fine dust and mist. Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN			
• EYES			
• INGESTION	Abdominal cramps (further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment (extra personal protection: P2 filter respirator for		Separated from strong oxidants, strong bases, strong acids, food and feedstuffs.	

harmful particles).

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0052

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

LEAD

ICSC: 0052

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.
	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
	CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric and sulfuric acids. Attacked by pure water and by weak organic acids in the presence of oxygen.	EFFECTS OF SHORT-TERM EXPOSURE: The substance may cause effects on the gastrointestinal tract, blood, central nervous system and kidneys, resulting in colics, shock, anemia, kidney damage and encephalopathy. Exposure may result in death. The effects may be delayed. Medical observation is indicated.
	OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV: ppm; 0.15 mg/m ³ (as TWA) (ACGIH 1993-1994).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the gastrointestinal tract, nervous system, blood, kidneys and immune system, resulting in severe lead colics, paralysis of muscle groups of the upper extremities (forearm, wrist and fingers), anemia, mood and personality changes, retarded mental development, and irreversible nephropathy. May cause retarded development of the new-born. Danger of cumulative effect.
	PHYSICAL PROPERTIES	Boiling point: 1740°C Melting point: 327.5°C
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air and water. In the food chain important to humans, bioaccumulation takes place, specifically in plants and water organisms, especially shellfish.	
NOTES		
Explosive limits are unknown in literature. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. Do NOT take working clothes home. Refer also to cards for specific lead compounds, e.g., lead chromate (ICSC # 0003), lead(II) oxide (ICSC # 0288). Transport Emergency Card: TEC (R)-61G12b		
ADDITIONAL INFORMATION		
ICSC: 0052		
LEAD		
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519 261

**IMPORTANT
LEGAL
NOTICE:**

Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.



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Schenectady, NY 12304-4690 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 683

Polychlorinated Biphenyls (PCBs)

Issued: 11/88

Revision: A, 9/92

Section 1. Material Identification

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Polychlorinated Biphenyls [$C_{12}H_{10-n}Cl_n$ ($n=3, 4, 5$)] **Description:** A class of nonpolar chlorinated hydrocarbons with a biphenyl nucleus (two benzene nuclei connected by a single C-C bond) in which any or all of the hydrogen atoms have been replaced by chlorine. Commercial PCBs are mixtures of chlorinated biphenyl isomers with varying degrees of chlorination. Prepared industrially by the chlorination of biphenyl with anhydrous chlorine in the presence of a catalyst such as ferric chloride or iron filings. Except for limited research and development applications, PCBs have not been produced in the US since 1977. When large quantities of PCBs were manufactured in the US, they were marketed under the tradename Aroclor (Monsanto) and were characterized by four digit numbers. The first two digits indicating biphenyls (12), triphenyls (54), or both (25, 44); the last two digits indicating the weight percent of chlorine. PCBs' thermal stability, nonflammability, and high dielectric capability made them very useful in electrical equipment. Formerly used as additives in hydraulic fluids, heat transfer systems, lubricants, cutting oils, printer's ink, fire retardants, asphalt, brake linings, automobile body sealants, plasticizers, adhesives, synthetic rubber, floor tile, wax extenders, dedusting agents, pesticide extenders, and carbonless reproducing paper. PCBs are still used in certain existing electrical capacitors and transformers that require enhanced electrical protection to avoid heating from sustained electric faults.

Other Designations: CAS No. 1336-36-3, Aroclor, Clophen, Chlorexol, chlorinated biphenyls, chlorinated diphenyl, chlorinated diphenylene, chloro biphenyl, chloro-1,1-biphenyl, Dykanol, Fenclor, Inerteen, Kaneclor, Montar, Noflamol, Phenoclor, Pyralene, Pyranol, Santotherm, Sovol, Therminol FR-1

Cautions: PCBs are potent liver toxins that may be absorbed through skin. Potentially, chronic or delayed toxicity is significant because PCBs accumulate in fatty tissue and may reasonably be anticipated to be carcinogens. PCBs are a bioaccumulative environmental hazard. When burned, decomposition products may be more hazardous than the PCBs.

R 1	NFPA
I 4	1
S 3*	2
K 1	0
* Skin absorption	HMIS
	H 2+
	F 1
	R 0
	PPE†
	† Sec. 8
	† Chronic Effects

Section 2. Ingredients and Occupational Exposure Limits

PCBs, contain various levels of polychlorinated dibenzofurans and chlorinated naphthalenes as contaminants

1991 OSHA PELs, Skin

8-hr TWA (Chlorodiphenyl, 42% chlorine): 1 mg/m³

8-hr TWA (Chlorodiphenyl, 54% chlorine): 0.5 mg/m³

1990 DFG (Germany) MAK, Danger of Cutaneous Absorption

TWA (Chlorodiphenyl, 42% chlorine): 0.1 ppm (1 mg/m³)

Category III: Substances with systemic effects, onset of effect > 2 hr.,

half-life > shift length (strongly cumulative)

Short-term Level: 1 ppm, 30 min., average value, 1 per shift

TWA (Chlorodiphenyl, 54% chlorine): 0.05 ppm (0.5 mg/m³)

Category III: (see above)

Short-term Level: 0.5 ppm, 30 min., average value, 1 per shift

1985-86 Toxicity Data*

Rat, oral, TD: 1250 mg/kg administered intermittently for 25 weeks produced liver tumors.

Mammal, oral, TD₀₁: 325 mg/kg administered to female for 30 days prior to mating and from the 1st to the 36th day of gestation produced effects on newborn (stillbirth; live birth index; viability index).

1990 NIOSH REL

TWA (Chlorodiphenyl, 42% chlorine): 0.001 mg/m³

TWA (Chlorodiphenyl, 54% chlorine): 0.001 mg/m³

1992-93 ACGIH TLVs, Skin *

TWA (Chlorodiphenyl, 42% chlorine): 1 mg/m³

TWA (Chlorodiphenyl, 54% chlorine): 0.5 mg/m³

* These guidelines offer reasonably good protection against systemic intoxication, but may not guarantee that chloroacne won't occur.

† See NIOSH, RTECS (TQ1350000), for additional reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data*

Boiling Point: 644-707 °F (340-375 °C)

Melting Point: 42%: -2.2 °F (-19 °C); 54%: 14 °F (-10 °C)

Vapor Pressure: 1 mm Hg at 100 °F (38 °C); 10⁻⁶ to 10⁻³ mm at 20 °C

Molecular Weight: 188.7 to 398.5

Specific Gravity: 1.3 to 1.8 at 20 °C

Water Solubility: Low solubility (0.007 to 5.9 mg/L)

Other Solubilities: Most common organic solvents, oils, and fats; slightly soluble in glycerol and glycols.

Appearance and Odor: PCBs vary from mobile oily liquids to white crystalline solids and hard non-crystalline resins, depending upon chlorine content.

* Physical and chemical properties vary widely according to degree and to the position of chlorination.

Section 4. Fire and Explosion Data

Flash Point: 286-385 °F (141-196 °C) OC*

Autoignition Temperature: 464 °F (240 °C)

LEL: None reported

UEL: None reported

Extinguishing Media: Use extinguishing media suitable to the surrounding fire. Use dry chemical, foam, carbon dioxide (CO₂), or water spray. Water spray may be ineffective. Use water spray to cool fire-exposed containers or transformers. Do not scatter PCBs with high-pressure water streams. **Unusual Fire or Explosion Hazards:** Combustion products (hydrogen chloride, phosgene, polychlorinated dibenzofurans, and furans) are more hazardous than the PCBs themselves. **Special Fire-fighting Procedures:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Approach fire from upwind to avoid highly toxic decomposition products. Structural firefighter's protective clothing will provide limited protection. Do not release runoff from fire control methods to sewers or waterways. Dike for later disposal.

* Flash points shown are a range for various PCBs. Some forms do not have flash points.

Section 5. Reactivity Data

Stability/Polymerization: PCBs are very stable materials but are subject to photodechlorination when exposed to sunlight or UV (spectral region above 290 nanometers). Hazardous polymerization cannot occur. **Chemical Incompatibilities:** PCBs are chemically inert and resistant to oxidation, acids, and bases. **Conditions to Avoid:** Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition [1112-1202 °F (600-650 °C)] of PCBs can produce highly toxic derivatives, including polychlorinated dibenzo-para-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), hydrogen chloride, phosgene and other irritants.

Section 6. Health Hazard Data

Carcinogenicity: The IARC,⁽¹⁴⁾ and NTP⁽¹⁵⁾ list PCBs as an IARC probable carcinogen (overall evaluation is 2A; limited human data; sufficient animal data) and NTP anticipated carcinogen, respectively. **Summary of Risks:** PCBs are potent liver toxins that can be absorbed through skin in toxic amounts without immediate pain or irritation. PCBs have low acute toxicity, but can accumulate in fatty tissue and severe effects may develop later. Generally, toxicity increases with a higher chlorine content; PCB-oxides are more toxic. The toxic action on the liver also increases with simultaneous exposure to other liver toxins, e.g. chlorinated solvents, alcohol, and certain drugs. Pathological pregnancies (abnormal pigmentations, abortions, stillbirths, and underweight births) have been associated with increased PCB serum levels in mothers; PCBs can be passed in breast milk. PCBs can affect the reproductive system of adults. **Medical Conditions Aggravated by Long-Term Exposure:** Skin, liver, and respiratory disease. **Target Organs:** Skin, liver, eyes, mucous membranes, and respiratory tract. **Primary Entry Routes:** Inhalation, dermal contact, ingestion. **Acute Effects:** Exposure to PCB vapor or mist is severely irritating to the skin, eyes, nose, throat, and upper respiratory tract. Intense acute exposure to high concentrations may result in eye, lung, and liver injury. Systemic effects include nausea, vomiting, increased blood pressure, fatigue, weight loss, jaundice, edema and abdominal pain. Cognitive, neurobehavior and psychomotor impairment and memory loss have also been seen after acute exposure. **Chronic Effects:** Repeated exposure to PCBs can cause chloroacne; redness, swelling, dryness, thickening and darkening of the skin and nails; swelling and burning of the eyes, and excessive eye discharge; distinctive hair follicles; gastrointestinal disturbances; neurological symptoms including headache, dizziness, depression, nervousness, numbness of the extremities, and joint and muscle pain; liver enlargement; menstrual changes in women; and chronic bronchitis. Cancer, primarily liver, is also a possible result of exposure, but data is inconclusive.

FIRST AID Eyes: Do not allow victim to rub or keep eyes tightly shut. Rinsing eyes with medical oil (olive, mineral) initially may remove PCB and halt irritation better than water rinsing alone. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately. **Skin:** Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. *Multiple soap and water washings are necessary.* Avoid the use of organic solvents to clean the skin. For reddened or blistered skin, consult a physician. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. **Ingestion:** In most cases, accidental PCB ingestion will not be recognized until long after vomiting would be of any value. Never give anything by mouth to an unconscious or convulsing person. Vomiting of the pure substance may cause aspiration. Consult a physician. **Note to Physicians:** Monitor patients for increased hepatic enzymes, chloroacne, and eye, gastrointestinal, and neurologic symptoms listed above. Diagnostic tests include blood levels of PCBs and altered liver enzymes.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate all unnecessary personnel, provide adequate ventilation, and isolate hazard area. Cleanup personnel should protect against vapor inhalation and skin or eye contact. For small spills, take up with sand or other noncombustible material and place into containers for later disposal. For larger spills, dike far ahead of spill to contain for later disposal. Follow applicable OSHA regulations (29 CFR 1910.120). **Environmental Transport:** PCBs have been shown to bio-concentrate significantly in aquatic organisms. **Ecotoxicity:** Bluegill, TLM: 0.278 ppm/96 hr. Mallard Duck, LD₅₀: 2000 ppm. **Environmental Degradation:** In general, the persistence of PCBs increases with an increase degree of chlorination. **Soil Absorption/Mobility:** PCBs are tightly absorbed in soil and generally do not leach significantly in most aqueous soil systems. However, in the presence of organic solvents, PCBs may leach rapidly through the soil. Volatilization of PCBs from soil may be slow, but over time may be significant. **Disposal:** Approved PCB disposal methods include: incineration with scrubbing, high-efficiency boilers, landfills, and EPA-approved alternative disposal methods. Each disposal method has various criteria. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 7. Spill, Leak, and Disposal Procedures

A Designations

RA Hazardous Waste (40 CFR 261.33): Not listed
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4): Final Reportable Quantity (RQ), 1 lb (0.454 kg) [* per CWA, Sec. 311(b)(4) and 307(a)]

OSHA Designations
 Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

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OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Minimum respiratory protection should include a combination dust-fume-mist and organic vapor cartridge or canister or air-supplied, depending upon the situation. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. **Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.** If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets to prevent all skin contact. Butyl rubber, neoprene, Teflon, and fluorocarbon rubber have break through times greater than 8 hrs. **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below the OSHA PEL (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.⁽¹⁶⁾ **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes and launder before reuse. Segregate contaminated clothing in such a manner so that there is no direct contact by laundry personnel. Implement quality assurance to ascertain the completeness of the cleaning procedures. Remove this material from your shoes and clean PPE. **Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in a closed, labelled, container in a ventilated area with appropriate air pollution control equipment. **Engineering Controls:** To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. **Administrative Controls:** Inform employees of the adverse health effects associated with PCBs. Limit access to PCB work areas to authorized personnel. Consider preplacement and periodic medical examinations with emphasis on the skin, liver, lung, and reproductive system. Monitor PCB blood levels. Consider possible effects on the fetus. Keep medical records for the entire length of employment and for the following 30 yrs.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Polychlorinated biphenyls

DOT Hazard Class: 9

UN No.: UN2315

DOT Packing Group: II

DOT Label: CLASS 9

Special Provisions (172.102): 9, N81

Packaging Authorizations

a) Exceptions: 173.155

b) Non-bulk Packaging: 173.202

c) Bulk Packaging: 173.241

Quantity Limitations

a) Passenger Aircraft or Railcar: 100 L

b) Cargo Aircraft Only: 220 L

Vessel Stowage Requirements

a) Vessel Stowage: A

b) Other: 34

MSDS Collection References: 26, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 163, 164, 168, 169, 174, 175, 180

Prepared by: MJ Wurth, BS; **Industrial Hygiene Review:** PA Roy MPH, CIH; **Medical Review:** AC Darlington, MD

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Appendix D

Accident Report Forms

PROCEDURE

**Subject: ACCIDENT PREVENTION PROGRAM:
REPORTING, INVESTIGATION, AND REVIEW**

1.0 PURPOSE AND SUMMARY

The purpose of this procedure is to establish the requirements for incident reporting, investigation, and review. This procedure is an integral part of the company's overall accident prevention program and aids in the determination of causal factors and corrective actions necessary to prevent incident re-occurrence. Key elements of this procedure include:

- All occupational injuries/illnesses, vehicle accidents, and near miss incidents must be promptly reported and investigated.
- All Occupational Safety and Health Administration (OSHA) recordable injuries/illnesses and chargeable vehicle accidents must be reviewed by an Accident Review Board. The Accident Review Board report is submitted/approved up through management to the appropriate business line Vice President.
- All incidents involving a fatality, major injury/illness, or resulting in significant property damage will be immediately reported to the business line Health and Safety Manager; Vice President, Health and Safety; business line Vice President; Vice President, Legal Department; and President.
- All business lines are required to submit a Monthly Loss Report summarizing all incidents that took place during the previous reporting period.

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3.2	Action/Approval Responsibilities
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5.1	Incident Reporting Process
5.2	Supervisor's Employee Injury Report
5.3	Vehicle Accident Report
5.4	General Liability, Property Damage, and Loss Report
5.5	Incident Investigation Report
5.6	Accident Review Board

- 5.7 Insurance Notification
- 5.5 Monthly Loss Report
- 6.0 Exception Provisions
- 7.0 Cross References
- 8.0 Attachments

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3.0 RESPONSIBILITY MATRIX

3.1 Procedure Responsibility

The Vice President, Health and Safety is responsible for the issuance, revision, and maintenance of this procedure.

1

3.2 Action/Approval Responsibilities

The Responsibility Matrix is Attachment 1.

4.0 DEFINITIONS

Company - All wholly-owned subsidiaries of The IT Group, Inc.

OSHA Recordable Case - All work-related deaths and illnesses, and those work-related injuries which result in loss of consciousness, restriction of work or motion, transfer to another job, or require medical treatment beyond first aid (see Attachment 7).

Lost Workday Case - Cases which involve days away from work or days of restricted work activity or both. Days away from work are the number of workdays (consecutive or not), excluding the date of injury, the employee **would have worked**, but could not because of occupational injury or illness; and/or the number of workdays (consecutive or not), excluding the date of injury, on which, because of injury or illness:

- The employee was assigned to another job on a temporary basis, or
- The employee worked at a permanent job less than full time, or
- The employee worked at a permanently-assigned job, but could not perform all duties normally connected with it.

Near Miss Incident - Any incident where no injury occurred, but where the potential for injury existed.

1

Chargeable Vehicle Accident - Any at-fault vehicle accident meeting any **one** of the following criteria:

- An individual other than an employee of the company is a party in the accident
- Property owned by a person or entity other than the company is damaged
- When only company employees, company owned or leased (not rented) vehicles, and company property is involved and damage exceeds \$1,000.00.

Vehicle - Any passenger vehicle, including trucks, used upon the highway or in private facilities for transporting passengers and/or property. For the purpose of this procedure, off-road vehicles such as earthmoving equipment, forklifts, non-highway use trucks, etc., are not considered vehicles.

5.0 TEXT

5.1 Incident Reporting Process

Employees are required to immediately report to their direct supervisor all occupational injuries, illnesses, accidents, and near miss incidents having the potential for injury. Any supervisor (but preferably the supervisor directly responsible for the involved employees) with first-hand knowledge of an incident is required to:

- Immediately arrange for appropriate medical attention and notify the responsible health and safety representative.
- Inform Continuum Healthcare of all incidents requiring medical attention by calling 1-800-229-3674, Extension 303, and providing the following information:
 - Employee name
 - Name of treating medical facility and phone number
 - Brief description of incident.

Continuum Healthcare's role is to interface with the treating physician to ensure that appropriate care is provided to the injured employee.

- Complete Continuum Healthcare's *Authorization for Treatment, Release of Medical Information, and Return to Work* (Attachment 8) for all cases requiring medical attention. The employee or his/her supervisor is to ensure that these completed forms are faxed to Continuum Healthcare at (770) 454-1280 prior to leaving the medical facility or as soon as reasonably possible.

- Prior to an injured employee returning to his/her job duties, a follow-up call to Continuum Healthcare must be made. The purpose of this call is to ensure work restrictions are clarified and planned work activities are consistent with medical recommendations.
- The supervisor is to initiate/complete the appropriate company documentation in accordance with the following incident classifications:
 - OSHA Recordable Cases
 - a. Supervisor's Employee Injury Report (Attachment 2)
 - b. Incident Investigation Report (Attachment 5)
 - c. Accident Review Board (Attachment 6)
 - First Aid Cases
 - a. Supervisor's Employee Injury Report (Attachment 2)
 - b. Incident Investigation Report (Attachment 5)
 - Chargeable Vehicle Accidents
 - a. Vehicle Accident Report (Attachment 3)
 - b. Incident Investigation Report (Attachment 5)
 - c. Accident Review Board (Attachment 6)
 - d. Driving Record Certification (Procedure HS800)
 - Non-Chargeable Vehicle Accidents
 - a. Vehicle Accident Report (Attachment 3)
 - b. Incident Investigation Report (Attachment 5)
 - Near Miss
 - a. Incident Investigation Report (Attachment 5)
 - Property Damage/General Liability
 - a. General Liability, Property Damage, and Loss Report (Attachment 4).

All forms, with the exception of the Accident Review Board and Incident Investigation Report, must be completed and forwarded to the appropriate health and safety representative within **one** business day of the incident.

All incidents involving a fatality, major injury/illness, or resulting in significant property damage are to be reported to the appropriate business line Vice President; Vice President, Health and Safety; Vice President, Legal Department; and President as soon as possible, but not later than the close of business on the day of the incident.

5.2 Supervisor's Employee Injury Report

The Supervisor's Employee Injury Report (Attachment 2) is to be completed for all incidents that result in an employee occupational injury or illness. It is to be initiated by the supervisor of the injured employee and forwarded to the project/location manager for comments. The appropriate health and safety representative must receive a copy of the report within one business day of the incident.

5.3 Vehicle Accident Report

The Vehicle Accident Report (Attachment 3) must be completed for any vehicle accident in which a company vehicle is involved. This includes company-owned or leased vehicles, rental vehicles, and personal vehicles being used for company business. This report is to be initiated by the employee involved in the accident or his/her direct supervisor, then forwarded to the appropriate health and safety representative.

5.4 General Liability, Property Damage, and Loss Report

The General Liability, Property Damage, and Loss Report is to be used for all losses or damage to company property in excess of \$1,000.00. This form must be completed for all third party property, regardless of value, damaged as a result of company activities. The employee most familiar with the events that contributed to the loss or damage will complete the form, then forward it to the project/location manager. The Corporate Risk Management Department must receive a copy of the report within one business day of the incident.

5.5 Incident Investigation Report

All injuries, illnesses, accidents, and near miss incidents will be investigated. Once arrangements for immediate medical care have been made, the employee's direct supervisor, with assistance from the health and safety representative and/or business line Health and Safety Manager, will:

- Reconstruct the conditions which led to the incident (collect the facts);
- Describe and document (include sketch, photos, etc.) how the incident occurred;
- List witnesses and collect written statements when possible;
- Identify and discuss the causative factors;
- Identify the unsafe act or unsafe condition that contributed to the incident;
- Identify possible systematic/management deficiencies; and
- List the corrective actions which are to be taken to prevent re-occurrence of the incident, the person responsible for the corrective action, and the date by which action is to be completed.

The investigation will be started as soon as possible after the incident and a written report (Attachment 5) submitted to the appropriate health and safety representative within 72 hours. In addition to the previous information, reports from external sources (police, insurance carriers, testing laboratories, etc.) are to be obtained as soon as they become available and forwarded to the recipients of the investigation report.

5.6 Accident Review Board

Each manager whose project/location experiences an OSHA recordable or a chargeable vehicle accident is required to convene an Accident Review Board within **10 days** of the accident. The purpose of the Accident Review Board is to review the information gathered for each incident and take appropriate action to prevent its recurrence. The Accident Review Board shall be composed of the project/location manager, the employee's direct supervisor, a health and safety representative, and the employee(s) involved in the incident. When appropriate, a representative of other internal sources of expertise should be involved.

It is generally not acceptable to discipline an employee for having an accident. However, if the Accident Review Board determines that the accident resulted from an unsafe act or violation of company procedure on the employee's part, the employee should be subject to disciplinary action in accordance with the company's progressive disciplinary action system (see Human Resources Procedure HR207).

5.7 Insurance Notification

The business line Health and Safety Manager or his/her designee is to report all employee injuries/illnesses requiring outside medical treatment to Constitution State Service Company (CSSC), a subsidiary of Travelers Insurance, within 24 hours of injury/illness occurrence. This may be accomplished by calling CSSC at 1-800-243-2490.

Some states (i.e., Ohio, Nevada, Washington, and West Virginia) have specific reporting requirements that differ from those previously discussed. Assistance for the reporting of incidents that occur in these states can be obtained through the Corporate Risk Management Department office at (412)-380-4097.

All vehicle accidents involving third party individuals or property, with the exception of company-rented Hertz automobiles, will be reported to CSSC by calling 1-800-243-2490 within 24 hours of the accident.

5.8 Monthly Loss Report

Each business line Health and Safety Manager is responsible to submit a Monthly Loss Report summarizing incidents that took place within their business line during the previous month. The business line Health and Safety Manager is responsible for submitting a consolidated package for the entire business line to the corporate health and safety office for **receipt no later than the 5th working day of the following month.**

6.0 EXCEPTION PROVISIONS

Variances and exceptions may be requested pursuant to the provisions of Procedure HS013, Health and Safety Procedure Variances.

7.0 CROSS REFERENCES

HR207 Disciplinary Action
HS013 Health and Safety Procedure Variances
HS800 Motor Vehicle Operations - General Requirements
HS810 Commercial Motor Vehicles

8.0 ATTACHMENTS

1. Responsibility Matrix
2. Supervisor's Employee Injury Report
3. Vehicle Accident Report
4. General Liability, Property Damage, and Loss Report
5. Incident Investigation Report
6. Accident Review Board Report
7. Injury/Illness Classification Guidelines
8. Continuum Healthcare Forms

ATTACHMENT 1

ACCIDENT PREVENTION PROGRAM: REPORTING, INVESTIGATION, AND REVIEW RESPONSIBILITY MATRIX

Action	Procedure Section	Responsible Party					
		Employee	Supervisor	Project/ Location Manager	Health and Safety Representative	Business Line Health and Safety Manager	Vice President, Health and Safety
Issue, Revise, and Maintain Procedure	3.1						X
Report All Incidents to Supervisor	5.1	X					
Notify Health and Safety Representative	5.1		X				
Arrange Medical Care	5.1		X		X		
Notify Continuum Healthcare of Incident	5.1		X		X		
Complete Continuum Healthcare Forms	5.1	X	X				
Initiate/Complete Company Forms	5.1		X				
Contact Continuum Healthcare Prior to Employee Returning to Job Duties	5.1		X		X		
Complete Investigation of Incident	5.5		X	X	X		
Conduct Accident Review Board	5.6		X	X	X		
Report Injury/Accident to CSSC	5.7				X	X	
Complete Monthly Loss Report	5.8					X	



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ATTACHMENT 2

SUPERVISOR'S EMPLOYEE INJURY REPORT

This report is to be initiated by the employee's supervisor. Please answer all questions completely. This report must be forwarded to the appropriate health and safety representative within 24 HOURS of the injury/illness.

EMPLOYEE

Injured's Name _____ Sex _____ S.S. No. _____ Birth Date _____
Home Address _____
City _____ State _____ Zip _____ Phone (____) _____
Job Title _____ Hire Date _____ Hourly Wage _____

SUPERVISOR

Date of Incident _____ Time _____ Time Reported _____ To Whom? _____
Project/Location Name _____ Address _____
Project No. _____ Time Shift Began _____ Did the Employee Leave Work? ☐ No ☐ Yes When _____
Has employee returned to work? ☐ No ☐ Yes When _____ Did employee miss a regularly scheduled shift? ☐ No ☐ Yes
Doctor/Hospital Name _____ Address _____
Witness Name(s) _____ Statement Attached? ☐ No ☐ Yes
Nature of Injury _____ Exact Body Part _____
Medical Attention: ☐ None ☐ First Aid On Site ☐ Doctor's Office ☐ Hospital ER ☐ Hospitalized
Job Assignment at Time of Incident _____
Describe Incident _____

What Unsafe Condition and/or Act Contributed to the Incident? _____

What Corrective Action Has Been Taken to Prevent Recurrence? _____

Supervisor _____
(Print) Signature Date

MANAGER

Comments on Incident and Corrective Action _____

Project/Location Mgr. _____
(Print) Signature Date

HEALTH AND SAFETY

Concur With Action Taken? ☐ No ☐ Yes Remarks _____

OSHA Classification:
☐ First Aid ☐ Recordable, No Lost/Restricted Workdays ☐ Recordable, Lost Workdays ☐ Recordable, Restricted Activity ☐ Fatality
Days Away From Work _____ Days Restricted Work _____
All injuries/illnesses requiring outside medical treatment must be reported to CSSC by calling 1-800-243-2490 within 24 hours of the incident. Contact Corporate Risk Management at (412) 380-4097 for cases occurring in Ohio, Nevada, Washington, or West Virginia
Workers' Compensation Claim Number (if applicable) _____
Health and Safety Representative:

(Print) Signature Date

These standard policies and procedures are applicable to all members of The IT Group, Inc., except where superseded or modified by the member Company.



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ATTACHMENT 3

VEHICLE ACCIDENT REPORT

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This report is to be initiated by the employee involved in the accident or his/her direct supervisor. Please answer all questions completely. This report must be forwarded to the appropriate health and safety representative within 24 HOURS of the accident.

ACCIDENT DESCRIPTION

ACCIDENT DATE _____ TIME _____ A.M. or P.M.
LOCATION OF ACCIDENT (CITY, STATE) _____
DESCRIPTION OF ACCIDENT _____

WITNESS _____ PHONE NO. () _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____
POLICE OFFICER'S NAME _____ DEPARTMENT _____

COMPANY VEHICLE

DRIVER _____ DRIVERS LICENSE _____ STATE _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____
WORK PHONE NO. () _____ S.S. NO. _____ PROJECT NAME/NO. _____
VEHICLE NO. _____ YEAR _____ MAKE _____ MODEL _____ LICENSE PLATE NO. _____
STATE _____ VEHICLE OWNER: ☐ COMPANY ☐ LEASED/RENTED ☐ PRIVATE VEHICLE
VEHICLE TYPE: ☐ COMMERCIAL MOTOR VEHICLE ☐ NON-COMMERCIAL
IF NOT COMPANY-OWNED: OWNER _____ PHONE NO. () _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____
VEHICLE DAMAGE _____
NO. OF VEHICLES TOWED FROM SCENE _____ NUMBER OF INJURIES _____ NUMBER OF FATALITIES _____
WERE HAZARDOUS MATERIALS RELEASED? ☐ YES ☐ NO IF YES, DESCRIBE MATERIALS _____

OTHER VEHICLE

DRIVER _____ DRIVERS LICENSE _____ STATE _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____
PHONE NO. () _____ S.S. NO. _____
OWNERS NAME (CHECK IF SAME AS DRIVER) _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____
INSURANCE COMPANY _____ POLICY NO. _____
AGENT'S NAME _____ PHONE NO. () _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____
VEHICLE: YEAR _____ MAKE _____ MODEL _____ PLATE NO. _____ STATE _____
VEHICLE I.D. NO. _____
VEHICLE DAMAGE _____
PASSENGERS: ☐ YES ☐ NO INJURIES: ☐ YES (List names and telephone numbers below) ☐ NO

VEHICLE ACCIDENT REPORT

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WEATHER: ☐ Clear ☐ Cloudy ☐ Fog ☐ Rain ☐ Sleet ☐ Snow Other _____
PAVEMENT: ☐ Asphalt ☐ Steel ☐ Concrete ☐ Wood ☐ Gravel/Dirt
☐ Brick/Stone Other _____
CONDITION: ☐ Dry ☐ Wet ☐ Icy ☐ Pot Holes Other _____
TRAFFIC CONTROL: ☐ Traffic Light ☐ Stop Sign ☐ Railroad ☐ No Intersection ☐ No Control
ROADWAY: Number of Lanes Each Direction: _____ ☐ Residential ☐ Divided Highway ☐ Undivided Highway

Draw and name roadways showing each vehicle, direction of travel, and point of impact. Indicate travel before the accident with a solid line and post-accident movement with a broken line.

SYMBOLS:

Your Vehicle ①
Other Vehicle(s) ②
③
Pedestrian ♀
Stop Sign ◻
Yield ▽
Railroad ⚡

ADDITIONAL INFORMATION: _____

All vehicle accidents involving third party individuals or property, with the exception of accidents involving only company-rented Hertz automobiles, must be reported to CSSC by calling 1-800-243-2490 within 24 hours of the accident.

WAS VEHICLE ACCIDENT REPORTED TO CSSC? ☐ YES ☐ NO CLAIM NUMBER _____

EMPLOYEE _____ (Print) _____ (Signature) _____ (Date)
SUPERVISOR _____ (Print) _____ (Signature) _____ (Date)
HEALTH & SAFETY REP. _____ (Print) _____ (Signature) _____ (Date)

REPORT MUST BE CALLED IN OR FAXED TO:
CORPORATE HEALTH AND SAFETY (PHONE: 412-372-7701, FAX: 412-858-3976)
AND CORPORATE RISK MANAGEMENT (PHONE: 412-380-4097, FAX: 412-380-6218)
WITHIN 24 HOURS, OR NOT LATER THAN NEXT BUSINESS DAY



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ATTACHMENT 4

GENERAL LIABILITY, PROPERTY DAMAGE, AND LOSS REPORT

This report is to be completed for all losses or damage to company property in excess of \$1,000.00 and all third party damage, regardless of value, resulting from company activities.

PROJECT/LOCATION _____ PROJECT NO. _____ DATE _____

ADDRESS _____

HOW DID DAMAGE OR LOSS OCCUR: _____

DESCRIPTION AND VALUE (\$) OF DAMAGED/LOST/STOLEN PROPERTY: _____

LOCATION OF DAMAGED/LOST/STOLEN PROPERTY (Before Loss): _____

DATE AND TIME OF DAMAGE, LOSS, OR THEFT: _____ Date: _____ Time: _____ a.m./p.m.

OWNER OF DAMAGED/LOST/STOLEN PROPERTY:

Name _____ Phone No. () _____

Address _____ City _____

Employer and Address _____

INJURED PARTIES (Also complete a Supervisor's Employee Injury Report if a Company Employee):

Name _____ Phone No. () _____

Address _____ City _____

Employer and Address _____

Description of Injury _____

WITNESSES:

1. Name _____ Phone No. () _____

Address _____ City _____

Employer and Address _____

2. Name _____ Phone No. () _____

Address _____ City _____

Employer and Address _____

WERE PICTURES TAKEN? ☐ YES ☐ NOWERE POLICE NOTIFIED? ☐ YES ☐ NO

DEPT. _____ REPORT NO. _____

COMPLETED BY:

(Print Name) _____

(Signature) _____

(Date) _____

PROJECT/LOCATION MANAGER:

(Print Name) _____

(Signature) _____

(Date) _____

REPORT MUST BE CALLED IN OR FAXED TO:
CORPORATE RISK MANAGEMENT (PHONE: 412-380-4097, FAX: 412-380-6218)
WITHIN 24 HOURS, OR NOT LATER THAN NEXT BUSINESS DAY

These standard policies and procedures are applicable to all members of The IT Group, Inc., except where superseded or modified by the member Company.



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ATTACHMENT 5

INCIDENT INVESTIGATION REPORT

*** MUST BE COMPLETED WITHIN 72 HOURS ***

Investigation Date _____ Date of Incident _____

Employee Name _____

Supervisor Name _____

Project Number/Name _____ / _____

Location of Incident _____

• Incident Classification

<u>Injury</u>	<input type="checkbox"/> First Aid	<u>Vehicle</u>	<input type="checkbox"/> Chargeable	<u>DOT</u>	<input type="checkbox"/> DOT Vehicle
	<input type="checkbox"/> OSHA Recordable		<input type="checkbox"/> Non-chargeable		<input type="checkbox"/> DOT Reportable
	<input type="checkbox"/> Lost Workday				
	<input type="checkbox"/> Restricted Workday	<u>Near Miss</u>	<input type="checkbox"/>	<u>General Liability</u>	<input type="checkbox"/>

- Description (Provide facts, describe how incident occurred, provide diagram [on back] or photos)

- Analysis 1 (What unsafe acts or conditions contributed to the incident?)

- Analysis 2 (What systematic or management deficiencies contributed to incident?)

- Corrective Action(s) (List corrective action items, responsible person, scheduled completion date)

- Witnesses (Attach statements or indicate why unavailable)

_____Investigated By _____
Print Name Signature DateProject/Location Mgr. _____
Print Name Signature Date

(Attach Additional Pages if Needed)

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ATTACHMENT 6

ACCIDENT REVIEW BOARD

DATE:		LOCATION:	
BOARD MEMBERS:			
ACCIDENT DATE:		EMPLOYEE(S) INVOLVED IN INCIDENT:	
INVESTIGATION COMPLETE: YES <input type="checkbox"/> NO <input type="checkbox"/>		ACCIDENT CLASSIFICATION:	
THE FOLLOWING INFORMATION <u>MUST</u> BE PROVIDED BY THE REVIEW BOARD FOR THIS INCIDENT (PRINT):			
SUPERVISOR: _____		PROJECT/LOCATION MGR.: _____	
CAUSE OF ACCIDENT:			
ACTION BY BOARD*:			
* ALL ACTIONS BY THE ACCIDENT REVIEW BOARD ARE SUBJECT TO FINAL REVIEW BY THE HUMAN RESOURCES AND LEGAL DEPARTMENTS.			
ACCEPTED:			
_____ EMPLOYEE SIGNATURE		_____ SUPERVISOR SIGNATURE	
APPROVED:		REJECTED FOR:	
_____ PROJECT/LOCATION MANAGER		_____ _____	
APPROVED:		REJECTED FOR:	
_____ BUSINESS LINE HEALTH AND SAFETY MANAGER OR DESIGNEE		_____ _____	
APPROVED:		REJECTED FOR:	
_____ BUSINESS LINE VICE PRESIDENT		_____ _____	

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ATTACHMENT 7**INJURY/ILLNESS CLASSIFICATION GUIDELINES**

Medical Treatment - The following are generally considered medical treatment. Work-related injuries for which this type of treatment was provided or should have been provided are almost always recordable.

- Treatment of **INFECTION**;
- Application of **ANTISEPTICS** during second or subsequent visit to medical facility;
- Treatment of **SECOND OR THIRD DEGREE BURN(S)**;
- Application of **SUTURES** (stitches);
- Application of **BUTTERFLY ADHESIVE DRESSING(S)** or **STERI STRIP(S)** in lieu of sutures;
- Removal of **FOREIGN BODIES EMBEDDED IN EYE**;
- Removal of **FOREIGN BODIES FROM WOUND**; if procedure is **COMPLICATED** because of depth of embedment, size, or location;
- Use of **PRESCRIPTION MEDICATIONS** (except a single dose administered on first visit for minor injury or discomfort);
- Use of hot or cold **SOAKING THERAPY** during second or subsequent visit to medical facility;
- Application of hot or cold **COMPRESS(ES)** during second or subsequent visit to medical facility;
- **CUTTING AWAY DEAD SKIN** (surgical debridement);
- Use of **WHIRLPOOL BATH THERAPY** during second or subsequent visit to medical facility;
- **POSITIVE X-RAY DIAGNOSIS** (fractures, broken bones, etc.); and
- **ADMISSION TO A HOSPITAL** or equivalent medical facility **FOR TREATMENT**.

First Aid Treatment - The following are generally considered first aid treatment (i.e., one-time treatment and subsequent observation of minor injuries) and should not be recorded if the work-related injury does not involve loss of consciousness, restriction of work or motion, or transfer to another job:

- Application of **ANTISEPTICS** during first visit to medical facility;
- Treatment of **FIRST DEGREE BURN(S)**;
- Application of **BANDAGE(S)** during any visit to medical facility;
- Use of **ELASTIC BANDAGE(S)** during first visit to medical facility;
- Removal of **FOREIGN BODIES NOT EMBEDDED IN EYE** if only irrigation is required;
- Removal of **FOREIGN BODIES FROM WOUND**; if procedure is **UNCOMPLICATED**, and is, for example, removed by tweezers or other simple technique;
- Use of **NON-PRESCRIPTION MEDICATIONS AND** administration of single doses of **PRESCRIPTION MEDICATION** on first visit for minor injury or discomfort;

- **SOAKING THERAPY** on initial visit to medical facility or removal of bandages by **SOAKING**;
- Application of hot or cold **COMPRESS(ES)** during first visit to medical facility;
- Application of **OINTMENTS** to abrasions to prevent drying or cracking;
- Use of **WHIRLPOOL BATH THERAPY** during first visit to medical facility;
- **NEGATIVE X-RAY DIAGNOSIS**; and
- **OBSERVATION** of injury during visit to medical facility.

The following procedure, by itself, is not considered medical treatment:

- Administration of **TETANUS SHOT(S)** or **BOOSTER(S)**. However, these shots are often given in conjunction with more serious injuries; consequently, injury requiring these shots may be recordable for other reasons.

Loss of Consciousness - If an employee loses consciousness as the result of a work-related injury/illness, the case must be recorded no matter what type of treatment was provided. The rationale behind this recording requirement is that loss of consciousness is generally associated with the more serious injuries.

Restriction of Work or Motion - Restricted work activity occurs when the employee, because of the impact of a job-related injury, is physically or mentally unable to perform all or any part of his or her normal assignment during all or any part of the workday or shift. The emphasis is on the employee's ability to perform normal job duties. Restriction of work or motion may result in either a lost worktime injury or a non-lost worktime injury, depending upon whether the restriction extended beyond the day of injury.

Transfer to Another Job - Injuries requiring transfer of the employee to another job are also considered serious enough to be recordable regardless of the type of treatment provided. Transfers are seldom the sole criterion for recordability because injury cases are almost always recordable on other grounds, primarily medical treatment or restriction of work or motion.



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ATTACHMENT 8

CONTINUUM HEALTHCARE FORMS

CASETrac CASE MANAGEMENT SERVICES AUTHORIZATION
FOR TREATMENT OF OCCUPATIONAL INJURY/ILLNESS

Employee Name: _____
Social Security #: _____
Job Title: _____
Project/Location: _____
Telephone #: _____
H&S Representative: _____
Body Part(s) Injured: _____
Describe in detail how incident occurred: _____

Injury: ☐ Illness: ☐
Incident Date: _____
Location of Accident/Exposure: _____

TO TREATING PHYSICIAN:

In the case of occupational injury/illness, please examine the employee and render necessary conservative treatment directly related to the occupational injury/illness.

Light Duty Work:

It is the policy of our company to provide work assignments, whenever possible, for employees with physical activity restrictions resulting from an occupational injury/illness. If the employee will be subject to a restriction, please contact **CASETrac Case Management** before releasing the employee, so that a light duty assignment may be arranged.

Medically Unfit to Return to Work:

It is the policy of our company to assist employees unable to return to work, due to an injury/illness, in obtaining needed medical care and other available benefits. Medical findings are also used to help evaluate unsafe conditions that may have led to the incident. Please help us assist our employees by contacting **CASETrac Case Management** with your findings as soon as possible, preferably before the employee leaves your office, but not later than the close of business on the day of initial treatment.

CASETrac Case Management: Telephone: 1-800-229-3674, Ext. 303 Fax: 1-770-454-1280

Please Send Reports To: **CASETrac Case Management Services**
4360 Chamblee Dunwoody Road, Suite 202
Atlanta, Georgia 30341

Please Send Bills To: Workers' Compensation Claims Administrator
Constitution State Service Company (Travelers)

DOCTOR, Please provide:

Medical Diagnosis: _____
Treatment Provided: _____

Recommended Work Limitation/Restriction: _____

Return Visit Needed: No ☐ Yes ☐ if yes, date _____ First Aid Only ☐

Physician Name: _____ Physician Telephone: _____

Physician Signature: _____

YOU MUST CALL CASETrac CASE MANAGEMENT FOR ALL OCCUPATIONAL INJURIES/ILLNESSES
REQUIRING OUTSIDE MEDICAL TREATMENT: 1-800-229-3674, EXTENSION 303.
FAX COMPLETED FORM TO CASETrac (770) 454-1280.

These standard policies and procedures are applicable to all members of The IT Group, Inc., except where superseded or modified by the member Company.



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ATTACHMENT 8

CONTINUUM HEALTHCARE FORMS

**CASETrac CASE MANAGEMENT SERVICES AUTHORIZATION FOR
RELEASE OF MEDICAL INFORMATION**

I, _____, grant authorization to _____
(Print Full Name) (Treating Physician's Name)
for the release of any information concerning my occupational injury/illness to:

CASETrac CASE MANAGEMENT SERVICES
4360 Chamblee Dunwoody road, Suite 202
Atlanta, Georgia 30341
Phone: (800) 229-3674, Extension 303
Fax: (770) 454-1280

for the purpose of disability follow-up and return to work authorization.

Please provide the following information:

EMPLOYEE INFORMATION:

Full Name: _____
Date of Birth: _____
Social Security #: _____
Home Address: _____
Home Phone: _____
Work Phone: _____

MEDICAL INFORMATION:

Treating Physician's Name: _____
Physician's Address: _____
Phone Number: _____
Fax Number: _____

Employee Signature: _____ Date: ____/____/____

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ATTACHMENT 8

CONTINUUM HEALTHCARE FORMS

CASE Trac CASE MANAGEMENT SERVICES RETURN-TO-WORK
EXAMINATION FORM

Exam Date: ____/____/____ Employee Name: _____

Birth Date: ____/____/____ Social Security #: _____

Job Title: _____ Sex: ☐ Male ☐ Female

Examining Provider: Please complete this form and fax to CASE Trac CASE MANAGEMENT SERVICES at (770) 454-1280. Please contact CASE Trac CASE MANAGEMENT SERVICES at (800) 229-3674 to report status of employee post-treatment.

DIAGNOSIS: _____

TREATMENT PLAN: _____

MEDICATIONS: _____

PHYSICAL THERAPY: _____

OTHER: _____

- ☐ May return to full duty work effective ____/____/____
☐ May return to limited duty from ____/____/____ to ____/____/____
☐ Unable to return to work from ____/____/____ to ____/____/____

WORK LIMITATIONS:

- ☐ Restricted lifting/pushing/pulling: maximum weight in lbs: _____ (company limits all lifting < = 60 lbs).
☐ Work only with right/left hand. ☐ Restricted repetitive motion right/left hand.
☐ Sitting job only. ☐ Restricted operation of moving equipment.
☐ Other: _____

FOLLOW-UP PLAN:

- ☐ Release from care.
☐ Schedule for follow-up appointment on ____/____/____.
Time _____ AM/PM
☐ Referral to _____
Appointment date ____/____/____ Time _____ AM/PM

Comments: _____

Examiner's Name (print) _____

Examiner's Signature _____

Date _____

Appendix E

Site and Hospital Location Map

08:39:22	STARTING DATE: 04/24/00	DATE LAST REV.:	DRAFT, CHCK. BY: C. TUMLIN	INITIATOR: W. CARTER	DWG. NO.: 1774902es.005
04/26/2000	DRAWN BY: P. COLEMAN	DRAWN BY:	ENGR. CHCK. BY: W. CARTER	PROJ. MGR. W. CARTER	PROJ. NO.: 774902

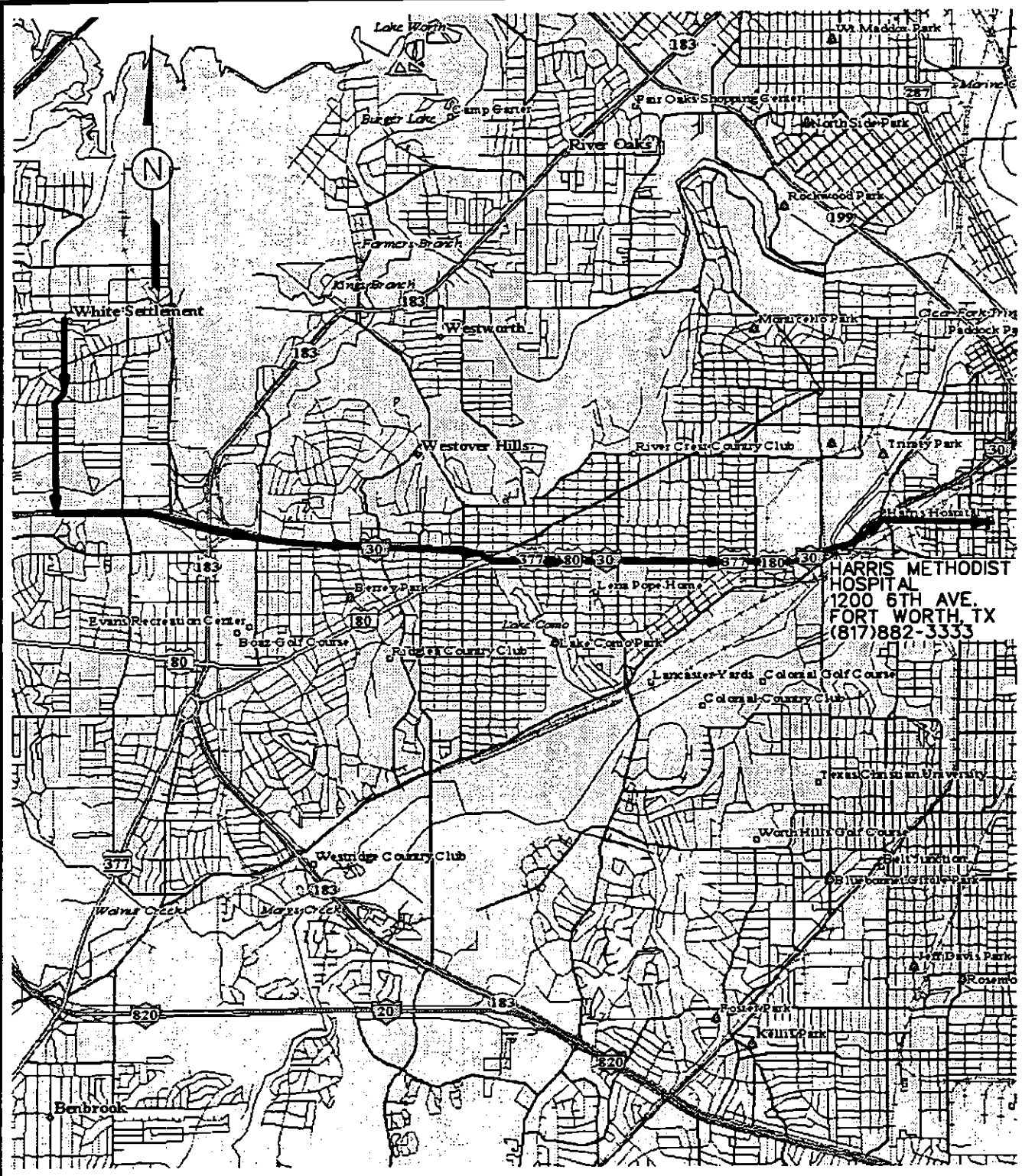


FIGURE E-1
SITE AND HOSPITAL
LOCATION MAP

NAVAL AIR STATION FORTH WORTH
FORT WORTH, TEXAS



Appendix F

Site Safety and Health Plan Acknowledgement Form

Printed Name	Signature	Representing	Date
--------------	-----------	--------------	------

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins or other markings on the paper.

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE